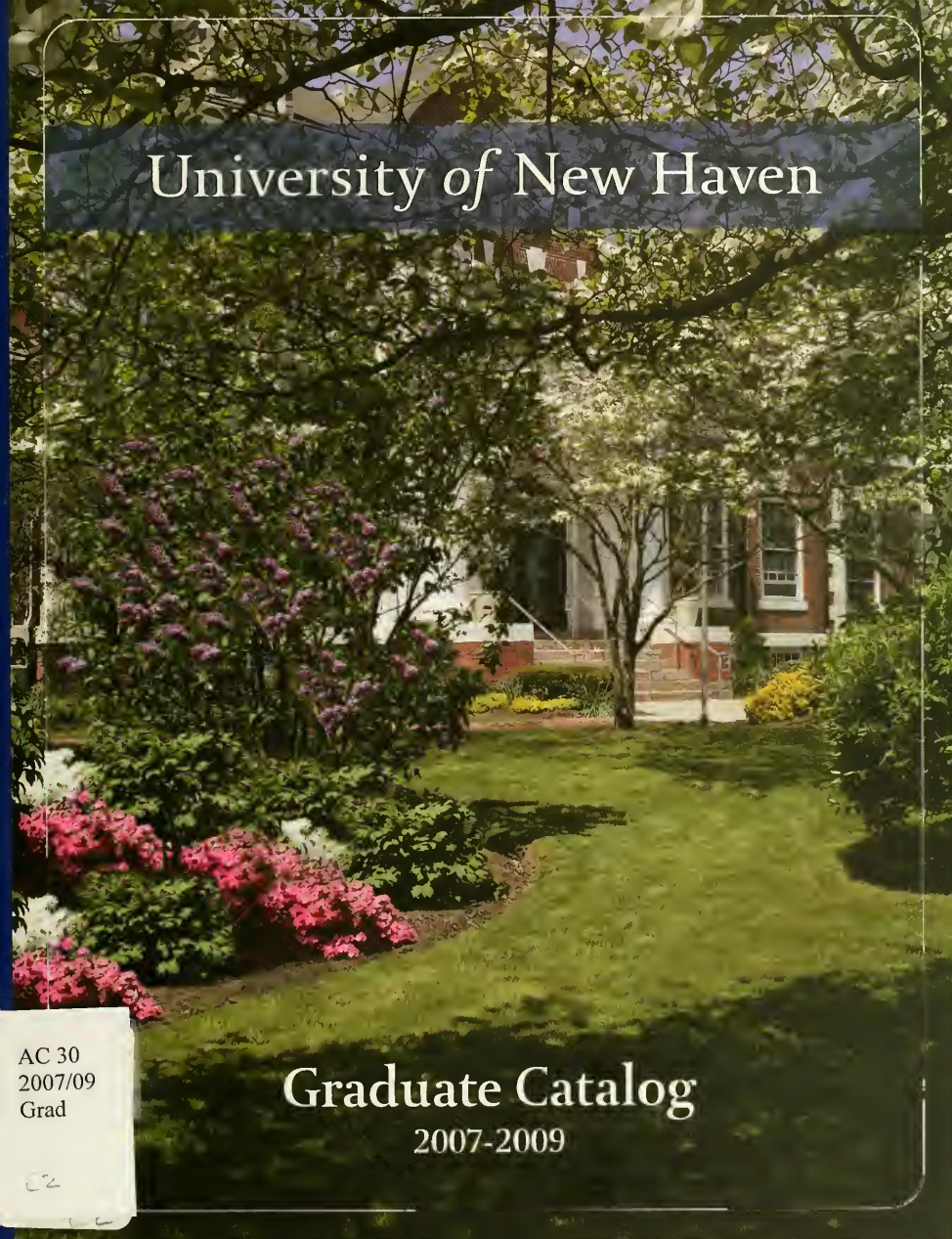


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# University *of* New Haven

# Graduate School Catalog

## 2007-2009


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UNIVERSITY OF
NEW HAVEN

This catalog supersedes all previous bulletins, catalogs, and brochures published by the Graduate School and describes academic programs to be offered beginning in Fall 2007. Graduate students admitted to the university for the Fall of 2007 and thereafter are bound by the regulations published in this catalog.

The University of New Haven is committed to affirmative action and to a policy which provides for equal opportunity in employment, advancement, admission, educational opportunity, and administration of financial aid to all persons on the basis of individual merit. This policy is administered without regard to race, color, national or ethnic origin, age, gender, religion, sexual orientation, or disabilities not related to performance. It is the policy of the University of New Haven not to discriminate on the basis of gender in its admissions, educational programs, activities, or employment policies, as required by Title IX of the 1972 Educational Amendments. The university is authorized under federal law to enroll nonimmigrant alien students.

Inquiries regarding nondiscrimination, affirmative action, equal opportunity, and Title IX may be directed to the university's equal opportunity/affirmative action officer at 300 Boston Post Road, West Haven, CT 06516; phone (203) 932-7199. Persons who have special needs requiring accommodation should notify the university's Disabilities Services and Resources Office at Voice/TDD number (203) 932-7331.

Every effort has been made to ensure that the information contained in this publication is accurate and current as of the date of publication; however, the university cannot be held responsible for typographical errors or omissions that may have occurred. Information changes that may be made subsequent to the date of publication may be found on the university's website.

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The university reserves the right to make, at any time, whatever changes it deems necessary in admission requirements, fees, charges, tuition, policies, regulations, and academic programs prior to the start of any class, term, semester, trimester, or session. All such changes are effective at such times as the proper authorities determine and may apply not only to prospective students but also to those already enrolled in the university.

Dear Graduate Student:

At the University of New Haven, we provide world-class career preparation in all of our programs, but our overarching goal is to prepare students to lead meaningful lives. As you examine this catalog and become aware of the breadth and diversity of our graduate programs, you will recognize the remarkable opportunity you are facing. You are about to embark on a journey in your chosen area of study that will help you grow personally and professionally. Our hope, and our mission, is that this journey will help you achieve a more meaningful career, the benefits of lifelong learning, and a sense of your responsibility as a citizen of the world.

The Graduate School at UNH was founded in 1969 and is one of the largest in Connecticut. Our advanced-degree alumni are employed in private industry and the public sector throughout the state, across the nation, and around the world. Our faculty hold doctoral or terminal degrees in their respective fields, and, in many cases, they bring with them national and international reputations in those fields. They also have professional, real-world experience that is especially vital to students' careers. They are committed in unrivaled ways to the success of each and every one of their students. A wide range of support services is also available to you at UNH, and we are constantly trying to improve and enrich the educational experience of our graduate students.

One of my favorite quotations is from the late Ernest Boyer, a former president of the Carnegie Foundation, who once warned that the "crisis of our time relates not to technical competence, but to a loss of the social and historical perspective, to the disastrous divorce of competence from conscience." As you focus your studies in your chosen field, I hope you will also allow yourself some time to question your own values as well as prevailing societal values and look for ways to improve the world that you will help form as a member of a global society.

I wish you success in your studies and personal enrichment through your experiences at the University of New Haven. Please come to see me if there is ever anything I can do to assist you.

Sincerely,

Steven H. Kaplan
President

# Graduate School Programs

## Master's Degree Programs

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Community Psychology, MA
Computer Science, MS
Criminal Justice, MS
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  Professional Education
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Emerging Leaders, MBA
Environmental Engineering, MS
Environmental Science, MS
Executive Engineering Management, MS
Executive Program, MBA
Fire Science, MS
Forensic Science, MS
Health Care Administration, MS
Human Nutrition, MS
Industrial Engineering, MSIE
  also MBA/MSIE, dual degree
Industrial/Organizational Psychology, MA
Labor Relations, MS
Management of Sports Industries, MS
Mechanical Engineering, MSME
National Security and Public Safety, MS
Public Administration, MPA
  also MBA/MPA, dual degree
Taxation, MS

## Graduate Certificates

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Applications of Psychology
Bioinformatics
Business Management
Civil Engineering Design
Computer Applications
Computer Programming
Computing
Finance
Fire/Arson Investigation
Fire Science Technology
Forensic Computer Investigation
Forensic Psychology
Forensic Science/Advanced Investigation
Forensic Science/Criminalistics
Forensic Science/Fire Science
Geographical Information Systems
Health Care Management
Human Resources Management
Information Protection and Security
International Business
International Relations
Lean-Six Sigma
Legal Studies
Logistics
Long-Term Health Care
Management of Sports Industries
Marketing
National Security
National Security Administration
National Security Technology
Network Administration
Psychology of Conflict Management
Public Administration
Public Management
Public Safety Management
Quality Engineering
Taxation
Telecommunication Management
Victim Advocacy and Services Management

# GRADUATE ACADEMIC CALENDAR 2007 – 2008

**Summer Term 2007**

**Monday, July 9 – Tuesday, August 21**

Awarding of Degrees, Saturday, August 25

**Fall Term 2007**

**Monday, September 10 – Saturday, December 15**

Last day to petition for January graduation, Monday, October 15

Thanksgiving recess, no classes
Monday, November 19 – Saturday, November 24

**Winter Term 2008**

**Wednesday, January 2 – Tuesday, April 1**

Commencement, 2 PM, Saturday, January 19

Last day to petition for May graduation, Monday, March 3

No classes, Friday, March 21
(A make-up class will be scheduled.)

**Spring Term 2008**

**Thursday, April 3 – Wednesday, July 2**

Commencement, 10 AM, Saturday, May 24

Memorial Day, no classes, Monday, May 26
(A make-up class will be scheduled.)

Last day to petition for awarding of degrees in August, Monday, June 16

**Summer Term 2008**

**Monday, July 7 – Tuesday, August 19**

Awarding of Degrees, Saturday, August 23

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# THE UNIVERSITY

*At the University of New Haven, we are wholly dedicated to the professional future of our students and caringly committed to their achievement. We provide the people, the programs, and the places that enable our students to prepare for personal success — in their careers and in life.*

The University of New Haven is a private, independent, comprehensive university based in southern New England, specializing in high-quality educational opportunities and preparation of both traditional and returning students for successful careers and self-reliant, productive service in a global society.

The Graduate School focuses on addressing students' needs for efficient acquisition of career-oriented credentials for advancement in the workplace and on helping individuals adapt to changes in their work environment through continuing education.

## Mission Statement

The University of New Haven is a student-centered comprehensive university with an emphasis on excellence in liberal arts and professional education. Our mission is to prepare our students to lead purposeful and fulfilling lives in a global society by providing the highest-quality education through experiential, collaborative, and discovery-based learning.

## Vision Statement

To be one of the very best comprehensive universities in the Northeast.

## Guiding Principles

UNH is committed to educational innovation, to continuous improvement in career and professional education, and to support for scholarship and professional development.

UNH takes pride in its commitment to service, quality, integrity, and personal caring. All our academic programs, as well as campus and student life, provide rich opportunities for leadership, personal growth, and participation in the aesthetics of life so that the university will embody a successful commitment to diversity, equality, and the "pursuit of happiness."

Our goal is to distinguish ourselves by the measures of student admissions; retention; career development; collaboration with business, industry, and community; and the success of our graduates and their support as alumni.

## Values

We believe in:

- the University of New Haven
- active learning
- discovery, creativity, and scholarship
- collaboration
- independent and critical thinking
- curiosity and inquisitiveness
- transformative educational experiences
- an appreciation of diverse viewpoints and different cultures
- individual and institutional integrity.

## The Graduate School

The graduate programs at the University of New Haven offer students the opportunity to enhance skills and knowledge for already chosen careers in highly technical and competitive fields. Other students studying at the graduate level are preparing to enter new careers. Most graduate programs offer multiple areas of specialization; flexibility in elective choices; opportunities for field work, internships, independent study, and research; and the possibility

of cooperative education work experience as part of the curriculum.

The university's faculty is outstanding in its combination of highly qualified, full-time academics (nearly 85 percent of whom hold doctoral or terminal degrees in their field from a broad spectrum of prestigious institutions) and part-time faculty members employed in area businesses and professions who bring, in addition to academic qualifications, practical insight and experience to the classroom.

The Graduate School offers more than 25 master's degree programs plus more than 40 graduate certificates. Classes are offered at locations across Connecticut.

The main campus in West Haven offers all academic programs except for the Emerging Leaders MBA. UNH's branch campus in New London specializes in accelerated graduate degree programs for busy adults. The programs are offered in a cohort style, meaning that the same group of students completes the entire program together. These programs include the MBA for Emerging Leaders and an Executive Master of Science in Engineering Management (EMSEM). The Master of Science in Education is offered at the main campus and at off-campus locations in New London and Newington. In addition to the graduate programs at the main campus in West Haven, the university is also authorized to offer the Master of Science in National Security and Public Safety at our UNH-Sandia campus in Livermore, California. The graduate National Security program is offered in Arlington, Virginia at our Crystal City campus, and also in New Mexico at the Sandia National Laboratory site on Kirtland Air Force Base. Most Graduate School courses are offered on a 13-week trimester schedule, beginning in September, January, and April. A condensed summer term is also offered. Most graduate courses are scheduled during the early evenings and on weekends to meet the needs of employed students.

# Accreditation

## Regional

The University of New Haven is a comprehensive, nonsectarian, independent institution of higher learning, chartered by the General Assembly of the State of Connecticut and accredited by the Board of Governors for Higher Education of the State of Connecticut. It is also accredited by the New England Association of Schools and Colleges, Inc. (NEASC), a nongovernmental, nationally recognized organization whose affiliated institutions include elementary schools through collegiate institutions offering post-graduate instruction.

NEASC accreditation of an institution indicates that it meets or exceeds criteria for the assessment of institutional quality periodically applied through a peer group review process. An accredited school or college is one which has available the necessary resources to achieve its stated mission through appropriate educational programs, is substantially doing so, and gives reasonable evidence that it will continue to do so in the foreseeable future.

Institutional integrity is also addressed through accreditation. NEASC accreditation is not partial but applies to the institution as a whole. As such, it is not a guarantee of the quality of every course or program offered or of the competence of individual graduates. Rather, it provides reasonable assurance about the quality of opportunities available to students.

## Engineering

The bachelor of science degree programs in chemical, civil, electrical, and mechanical engineering are fully accredited by the Engineering Accreditation Commission (EAC) of the Accreditation Board for Engineering and Technology (ABET). The computer science bachelor's degree program is fully accredited by the Computing Accreditation Commission (CAC) of the Accreditation Board for Engineering and Technology (ABET).

### California Programs

Authorization for UNH to operate in California is granted through the Bureau for Private Postsecondary and Vocational Education, which oversees and monitors the university's compliance with regulations set forth in the California Education Code and is the students' primary advocate in matters of consumer protection. This authorization applies to the university's master of science program in National Security and Public Safety offered at the UNH California campus in Livermore.

### New Mexico Programs

Based upon the University of New Haven's full accreditation by the New England Association of Schools and Colleges, and the Connecticut Department of Higher Education, the New Mexico Commission on Higher Education has determined that the University of New Haven qualifies for exempt status.

### Virginia Programs

The State Council of Higher Education for Virginia (SCHEV) has certified the University of New Haven to operate in the Commonwealth of Virginia and has granted authorization for the university to offer graduate programs in National Security and Public Safety and in National Security with a concentration in Information Protection and Security, as well as a graduate certificate in National Security.

### College of Business

The College of Business is actively seeking accreditation by the Association to Advance Collegiate Schools of Business (AACSB). The College has voluntarily committed to participate in a systematic program of quality enhancement and continuous improvement that makes AACSB accreditation a more realistic and operational objective.

### Other Memberships

The university holds memberships in the Council of Graduate Schools, the Northeastern Association of Graduate Schools, the Accreditation Board for Engineering and Technology, the National Associaion of Schools of Public Affairs and Administration (NASPAA), the National Association of Boards of Examiners for Nursing Home Administration, the American Council on Education, the Association of American Colleges, the National Association of Independent Colleges and Universities, the College Entrance Examination Board, and other regional and national professional organizations.

## History

The University of New Haven was founded in 1920 as the New Haven YMCA Junior College, a branch of Northeastern University. It became New Haven College in 1926 by an act of the Connecticut General Assembly. The college moved to its current location in 1960.

In 1969, New Haven College added the Graduate School to its established baccalaureate programs. Initially offering programs in business administration and industrial engineering, the Graduate School expanded rapidly. Today, more than 25 master's level programs and additional courses of study have a graduate enrollment of more than 1,700 students.

In 1970, on its fiftieth anniversary, New Haven College became the University of New Haven, reflecting the increased scope and diversity of academic programs offered.

Today the university offers more than 100 degree programs in the Graduate School and four colleges: the College of Arts and Sciences, the College of Business, the Tagliatela College of Engineering, and the Henry C. Lee College of Criminal Justice and Forensic Sciences.

## The University's Academic Colleges

The University of New Haven has five academic colleges, each with its own faculty and set of graduate programs.

## College of Arts and Sciences

The College of Arts and Sciences, through the Graduate School, offers master's degree programs in six fields: master of science degrees in cellular and molecular biology, education, environmental science, and human nutrition; master of arts degrees in community psychology and industrial/organizational psychology. Within the field of education, two options are available: master of science degrees in teacher certification and in professional education. The human nutrition program is offered part-time, one weekend per month, at the main campus. The environmental science program provides many opportunities for field and laboratory experience along with classroom instruction; students in cellular and molecular biology are training for specialized careers in the fields of biotechnology, basic science, and pharmacological research. Graduate certificates provide short, specific programs in several fields including Geographical Information Systems (GIS), applications of psychology, and bioinformatics.

At the undergraduate level, the College of Arts and Sciences offers associate and bachelor's degree programs in a wide variety of fields from art to dental hygiene, music and sound recording to psychology. A combined five-year BS/MS program in environmental science is offered for students who meet certain qualifications. UNH undergraduates who want to pursue a teaching career also may be eligible for early admission to the UNH Education Department through the Accelerated Entry Process, which allows qualified undergraduates to begin their education coursework as undergraduates and enables them to earn a bachelor's degree, master's degree, and Connecticut certification in five years. Detailed information can be found in the *Undergraduate Catalog.*

## College of Business

The mission of the College of Business is to provide high-quality, career-oriented education to students with varied backgrounds and experiences. The college will seek to accomplish this through comprehensive teaching programs and by engaging in a variety of research and consulting activities involving both the development of knowledge and its communication to the academic, business, and government sectors. It is the vision of the college to be the regional leader in providing career-oriented, contemporary business education.

As the business environment becomes more complex, the College of Business provides educational experiences that prepare students to face the challenges of a dynamic world and to meet their responsibilities within a global society. To meet this goal, career-oriented programs employ current knowledge and techniques presented in a manner appropriate to the diverse backgrounds and experiences of our graduate students.

Through the Graduate School, the College of Business offers an MBA program with a variety of concentrations and master's degree programs in health care administration, labor relations, and management of sports industries. A master's in public administration (MPA) as well as two dual degrees, MBA/MPA and MBA/MS industrial engineering, are also available. The college also offers an executive MBA program which has been a highly respected educational resource for Connecticut business leaders for more than a quarter of a century. In addition, many graduate certificates are available for students who seek a short graduate curriculum concentrated in a specific business area.

At the undergraduate level, the College of Business offers associate and bachelor's degree programs in the departments of accounting, communication, economics and finance, hotel and restaurant management, marketing, management, and tourism and hospitality administration. Detailed information can be found in the *Undergraduate Catalog.*

## Tagliatela College of Engineering

Few professions can match engineering for challenge and excitement, and the changing face of engineering will shape the world in the twenty-first century—a world of exotic materials, new sources of energy, staggering telecommunications and computing capabilities, cybernetic factories, and public works needed by society. The mission of the Tagliatela College of Engineering (TCoE) is to pre-

pare individuals for the professional practice in diverse engineering areas, computer science, and chemistry. In addition, TCoE prepares individuals for lifelong education in their professional careers and for such formal post-baccalaureate education as their inclination and professional growth require.

Master of science degree programs are offered through the Graduate School in computer science, electrical engineering, environmental engineering, executive engineering management (EMSEM), industrial engineering, and mechanical engineering. A dual degree program combines the MBA with the MS industrial engineering degree. Graduate certificates are offered in civil engineering design, computer applications, computer programming, computing, logistics, and quality engineering.

At the undergraduate level, TCoE offers degrees in chemistry, computer engineering, information technology, and general engineering along with its four EAC/ABET-accredited engineering degrees in chemical, civil, electrical, and mechanical engineering and its CAC/ABET- accredited degree in computer science. Detailed information can be found in the *Undergraduate Catalog.*

## Henry C. Lee College of Criminal Justice and Forensic Sciences

Through the Graduate School, the university's Henry C. Lee College of Criminal Justice and Forensic Sciences offers career-oriented graduate degree programs in criminal justice, fire science, forensic science (including the criminalistics laboratory program), and national security and public safety. A wide range of graduate certificates is also available in the same fields and in forensic computer investigation and in information protection and security, for students seeking shorter study in specific subcategories of these disciplines.

Broad professional education is provided, often integrating classroom learning with laboratory and field experience. The programs attract students of varied ages and levels of expertise, from persons new to the field to seasoned professionals seeking national and/or regional accreditation and licensure.

Safety and professional degree programs and certificates also are offered at the undergraduate level in all the same fields, plus legal studies. Information on undergraduate programs appears in the *Undergraduate Catalog.*

## University College

University College administers full- and part-time undergraduate and graduate degree programs and customized corporate training in a variety of course format options including:

- Seven-week fall and spring courses
- Five-week summer courses
- Two-week winter session intensive courses
- Saturday courses
- Online and hybrid courses

University College reflects the University of New Haven's continued dedication to meeting the educational needs of adult students and the region's corporate communities. Programs and courses are specifically designed with adult learners in mind, focusing on academic excellence, convenience, and flexibility.

### Continuing and Professional Studies (CAPS):

Evening undergraduate degree and certificate programs are administered through the Continuing and Professional Studies (CAPS). The Accelerated Degree Program offers evening bachelor's degrees in the following areas:

- Accounting
- Business Administration
- Public Administration
- Liberal Studies

Undergraduate evening students can also enroll in our other undergraduate degree programs. Some can be completed in evening study while others may require some day classes. Students can complete the university's Core Competency Requirements in the evening accelerated format.

### The Center for Corporate Education:

The Center for Corporate Education provides various customized corporate training programs to

local and regional business and industry. Additionally, the Center administers the following cohort programs on the main campus and on the Southeastern Campus in New London:

- Executive MBA (EMBA)
- MBA for Emerging Leaders
- Executive Master of Science in Engineering Management (EMSEM)
- Master of Arts in Industrial/Organizational Psychology (MAIOP)
- Master of Public Administration (MPA)
- Master of Science in Taxation
- Master of Science in Human Nutrition
- Master of Science in Education
- Master of Science in Computer Science
- Bachelor of Science in Mechanical Engineering
- Human Resources Management Certificate
- Computer Science Certificate
- Lean - Six Sigma Certificate
- Leadership Certificate
- Project Management Certificate

**Evening Services:**

The Evening Services Office combines the functions of the Admissions, Registrar and Records, and Academic Services Offices for evening undergraduate and graduate students. This provides students with a convenient one-stop office designed to meet their needs and answer their questions. For more information see Student Services elsewhere in this catalog.

## The New Haven Area

The University of New Haven is located in south central Connecticut, between New York City and Boston. Situated on a West Haven hillside overlooking Long Island Sound, the campus is easily accessible by car (from Interstate 95), bus, and train service, as well as local airports.

New Haven, just ten minutes away from the campus, is a city where arts and cultural activities flourish, as do science and business. Settled in 1638 and rich in history and heritage, New Haven is proud of its past, prouder of its present, and actively planning for its future. The city is a manufacturing center, a deep-water harbor, a major arts center, a college town with seven colleges and universities in the immediate area, and the "Gateway to New England."

New Haven is home to the Shubert, Long Wharf, and Yale Repertory theaters; the New Haven Symphony Orchestra; and a number of museums, including the Peabody Museum of Natural History, the Eli Whitney Museum, the Yale Center for British Art, and the oldest university gallery in the western hemisphere, the Yale Art Gallery.

## The Campus

The university's 80-acre campus contains 28 major buildings that house modern laboratory and research facilities, the latest computer equipment, athletic facilities, and residence halls.

The Main Campus includes administration and classroom facilities in Ellis C. Maxcy Hall (the main administration building, financial aid, College of Arts and Sciences, College of Business); Bayer Hall (undergraduate admissions); Phillip Kaplan Hall; the Jacob F. Buckman Hall of Engineering (Tagliatela College of Engineering); Echlin Hall (which houses University College, Information Services, the Computer Science Department, the Fire Science Department, the Executive MBA office, and classroom spaces); the Marvin K. Peterson Library; Bartels Hall, the campus student center; the Psychology Building; Robert B. Dodds Hall (with classrooms, offices, labs, Dodds Theater, and the Seton Art Gallery); the Campus Store; residence halls; and the Gate House (graduate admissions).

South Campus includes South Campus Hall (which houses the Graduate and Undergraduate Registrar's Office and is home to the Henry C. Lee College of Criminal Justice and Forensic Sciences) and Harugari Hall. The university's athletic fields and Charger Gymnasium are located at North Campus; the David A. Beckerman Recreation Center is scheduled to open on the Main Campus in the fall of 2007.

The UNH Theater is in residence on campus and produces a variety of productions each year, includ-

ing children's theater. Dodds Hall is home to the Seton Art Gallery, where the work of renowned local and national artists is featured, along with gallery space devoted to the university's art department.

# Admission

## General Requirements

Applicants to the University of New Haven Graduate School are required to hold a baccalaureate degree from an accredited institution. Individual programs may have additional requirements for admission, details of which are included in the program listings in this catalog. For most programs, admission decisions are based primarily on an applicant's undergraduate record. A prospective student who is currently completing undergraduate study should submit an official transcript complete to the date of application. In such cases, an admission decision may be made on the basis of a partial transcript, contingent upon completion of the baccalaureate degree. Registration will not be permitted until a final, official transcript is submitted to the Graduate Admissions Office. Students may submit scores from the Graduate Record Examination (GRE), PRAXIS, or the Miller Analogies Test in support of their applications. Students applying to certain programs will be required to have test scores from such examinations sent directly from the testing service to the Graduate Admissions Office. Information regarding specific requirements for submission of test scores is contained in the program descriptions elsewhere in this catalog. All students entering the university must comply with state laws regarding immunizations for measles and rubella. Applicants to the Graduate School must complete the Measles Immunization Form and return it to the UNH Health Services Office. In addition, students enrolling at UNH for full-time study must also file a completed Health Examination Report with the Health Services Office. Medical forms and information can be obtained by contacting the Health Services Office at (203) 932-7079 or 1-800-DIAL-UNH, Ext. 7079. It is the policy of the university, in cases of noncompliance, to withhold registration at the beginning of each term.

## Procedure

An applicant for admission to the Graduate School must submit the university graduate school application form, required letters of recommendation, complete official transcripts of all previous college work (sent directly from the colleges to the Graduate Admissions Office), the nonrefundable application fee, and test scores (if required). All application materials become property of the University of New Haven. An application form is located at the back of this catalog and online at www.newhaven.edu. In addition to the above application materials, all students must submit a completed measles/rubella immunization form to the Health Services Office. All full-time students are also required to submit the Health Examination Report. In most cases, full-time and part-time domestic students may be admitted for any term, with the exception of a few selected degree programs. See individual programs for requirements.

Students (including international students required to maintain full-time enrollment based on immigration requirements) who are applying for full-time study may be notified that certain programs are limited to admission in the fall term only due to the planned sequence of courses. Should a student be unable to enter the Graduate School during the term for which admission is granted, the acceptance will remain open for one calendar year. After one year, a new application for admission may be required. Students accepted into a program will be subject to the specific program requirements and rules of the *Graduate Catalog* in effect for the term in which the student is enrolled in the first course in that degree program. However, if a student subsequently submits a program change request and is accepted into a new or different program/degree, the student will be subject to the rules of the *Graduate Catalog* in effect at the date/time of acceptance into the newly selected program.

## Admission Categories

Admitted applicants and students in the Graduate

School are assigned to one of four categories: fully accepted, provisionally accepted, special, (nonmatriculant), or auditor. Domestic students who wish to matriculate in a degree program, but who have not completed the application process and/or have not yet received a formal acceptance decision, may register as in-process students for one term while completing the application process.

A bachelor's degree is required for admission to all categories.

### Fully Accepted

Students accepted without special stipulations for entrance into a regular degree program or certificate study are classified as fully accepted students.

### Provisionally Accepted

An applicant may be accepted provisionally when his or her undergraduate grade point average falls below the standard set for full acceptance, acceptance requires additional test or document submission to support entrance into the program selected, or the undergraduate background indicates a need for additional coursework or a short period of academic supervision and review. Students accepted provisionally should seek advice from the appropriate coordinator or advisor during the provisional period. Students must complete the stipulated requirements of the provisional acceptance at the beginning of the program of study. Upon completion of these requirements, each student's record will be evaluated for admission as a fully matriculated candidate for the degree.

### Special (Nonmatriculated)

Special student status is reserved for students who do not wish to matriculate in a degree program or certificate study. Registration in this category is normally limited to no more than 12 credit hours of graduate work. Students who wish to continue graduate work must be accepted into a specific graduate program. Special students are responsible for meeting prerequisite requirements for the courses they wish to take.

### Auditor

An auditor is allowed to attend class and is expected to participate in class discussions and complete the required assignments. An auditor receives no grade or credit toward any degree. While auditor status does not imply admission to any graduate degree program, there is an official registration procedure, and a notation of audit is placed on the transcript. Both current students and new students are eligible to audit Graduate School courses.

An alumni audit program provides UNH degree-holding alumni/ae with a low-cost method of upgrading information and skills obtained in the process of completing their degrees at the University of New Haven. This program is not intended for the development of new skills or for the learning of new or more advanced topics. Therefore, the courses available (space permitting) to alumni auditors are limited to those at or below the level of the UNH degree obtained by the student.

## Admission of International Students

University of New Haven graduate programs are open to qualified international students. To qualify, a prospective student must have completed sufficient undergraduate preparation in a degree program acceptable to the Graduate School. The Graduate School operates on a trimester system with three terms. The fall term begins in early September, the winter term begins in early January, and the spring term begins in early April.

Because the review of international applications takes considerable time, it is important that the application and all supporting materials be received by the Graduate Admissions Office prior to the deadline dates outlined in the international student information packet.

U.S. Immigration regulations require that a person holding student status make satisfactory progress toward a degree. This requires full-time study, which is generally interpreted to mean completing at least three courses (9 credit hours) each trimester. Prospective international students should note that graduate certificates, the Executive MBA, the mechanical engineering master's program, and the

human nutrition master's program are not designed to permit full-time study. Also, the programs in the Education Department generally do not accept international student applications.

To apply for admission to the Graduate School and to be ready to begin study, prospective international students must complete all of the steps outlined in the following section.

## International Application Process

All applicants must submit the following application materials:

1. A completed application form and the appropriate application fee.
2. Two letters of recommendation.
3. Official transcripts of all undergraduate and graduate work completed. Applicants may be asked to provide substantiation of courses taken, grades received, and/or the academic reputation of the undergraduate school within the educational system of the country in which the school is located. A certified English translation must accompany all non-English transcripts.
4. Proof of English proficiency. This must consist of one of the following:
   a. The Test of English as a Foreign Language (TOEFL) examination with a minimum score of 70 on the internet-based test (IBT) or 190 on the computer-based test (CBT) or 520 on the paper-based test (PBT). The official score report must be sent directly from the testing service/site to the Graduate Admissions Office. The International English Language Testing System (IELTS) with a minimum score of 6.0 is also acceptable. IELTS is jointly managed by the British Council, IDP:IELTS Australia, and the University of Cambridge ESOL Examinations.
   b. Proof of completion of Level 112 in an ELS Language Center program (contact www.els.edu for information).
   c. Proof of completion of the Advanced Level from any of the USA-based Kaplan English Programs (www.kaplanenglish.com).
   d. Proof that undergraduate academic instruction and courses were completed using the English language.

   *Students whose TOEFL scores are less than 83 IBT or 220 CBT or 560 PBT and/or students who enter the Graduate School following completion of an intensive English language training program may be required to take and pass E 600 English Language Workshop in the first term of enrollment at the Graduate School.*
5. Financial documentation. International students must provide verification of sufficient funds for study and living expenses for 12 months. This verification must be one of the following:
   a. Completed UNH Financial Statement of International Students form and bank statement.
   b. Current official scholarship letter. *The University of New Haven does not offer need-based financial assistance to international students.*
6. Acceptance fee of $200. This nonrefundable fee must be paid before immigration documents (Form I-20 for students entering the United States on F-1 visas or DS-2019 for J-1 students) will be issued. This fee is not credited toward tuition and is not required in advance from scholarship students.
7. Medical Forms. All entering students must comply with health requirements by submitting the following forms required by the UNH Health Services Office:
   a. Measles/Rubella Immunization Form (required of all students)
   b. Health Examination Report (required of all full-time students).

Visa documents (Form I-20 or Form DS-2019) will be issued only after a student has submitted all required materials, been accepted in a program of study, provided acceptable proof of English proficiency and financial status, and paid the $200 acceptance fee.

The international student acceptance fee is required of all international undergraduate and graduate students at the university. This fee directly and

indirectly supports a variety of services and programs for international students, including orientation programs, cross-cultural workshops, local community activities, international alumni programs, subscriptions to international newspapers/magazines for the campus library, and operation of the International Services Office.

### Initial Attendance at the University

All international students accepted into the Graduate School must report to the International Services Office before registering for graduate classes.

At the time of registration, students will be required to pay the tuition and fees for one trimester.

International students must subscribe to the university's international student health insurance. The premium of $700 per year will be charged to all international students. Requests for information regarding coverage and/or premiums for dependents should be directed to the Health Services department.

## Registration

Registration deadlines are listed in the course schedules published for each term. Returning students and new domestic students who have been admitted to programs will receive registration materials and can register online or by email, fax, mail, phone, or in person.

Domestic students who have not completed the application process and/or have not yet received a formal acceptance decision may register as in-process students for most programs. International students may not register as in-process students. Proof that the in-process student has an undergraduate degree will be required at the time of registration; and, whenever possible, transcripts of previous coursework should be provided to facilitate advisement. In-process status remains in effect for one term. In-process students may register for no more than six credits without the approval of the Director of Graduate Admissions or the coordinator of the program for which they are applying.

It is the responsibility of in-process students to see to it that all materials in support of their applications are received by the Graduate Admissions Office in time for an acceptance decision before the next term. In-process students will not be permitted to register for a second term until an acceptance decision has been made. Permission to register as an in-process student does not guarantee admission to the Graduate School.

Students who fail to register for three consecutive terms will no longer receive registration materials. It will be the responsibility of such students to notify the Graduate Records Office of their desire to continue graduate study. Files for students who revert to an inactive status will be retained for two years. At the end of that period, only a permanent record of credits earned is maintained.

Students may not add a course after the first class meeting without written permission of the instructor. Course additions may be handled in person or by email, fax, or mail.

A student may not withdraw from a course any time after the seventh scheduled class meeting. Course withdrawals may be handled in person or by email, fax, or mail.

The university reserves the right to change class schedules or instructors at any time. It further reserves the right to cancel any course and, in such cases, will refund full tuition to the students.

Students with an outstanding balance will not be permitted to register. Current students who register after the registration deadline will be assessed a late-registration fee.

# ACADEMIC POLICIES

## Academic Honesty and Ethics

The policies of the University of New Haven require commitment to academic honesty and ethics. Violations of university standards for academic honesty (including plagiarism), whether in fact or in spirit, will usually be handled by the faculty member involved. However, if sufficient reason is found, violation may be grounds for dismissal from the Graduate School. Students are expected to complete all course requirements on their own initiative, with no collaboration unless specifically authorized by the instructor. In addition, use of the work, ideas, or knowledge of another person, publisher, company, government, or organization must be properly identified by reference or note in all materials submitted by the student. Students wishing to appeal the decision of a faculty member regarding academic honesty and ethics should contact the Office of the Associate Provost for Graduate Studies for information.

## Academic Records

For each student enrolled in the Graduate School, academic records are maintained and/or housed in the Graduate Records Office. Records include the application for admission and supporting documents such as test scores, transcripts of undergraduate and other prior study, letters of recommendation, the academic transcript, course schedules, petitions filed by the student, and any other documents or correspondence pertaining to the student's academic work. The Registrar is responsible for controlling access to and disclosure of students' educational records. Students desiring to inspect or review their records should address a written, dated request to the Registrar/Graduate Records. Information regarding confidentiality, privacy, and right of access to student records can be obtained from the Registrar.

## Attendance

It is the responsibility of the student to attend all classes and to take all examinations as scheduled. Faculty have the right to require a standard of attendance, even if it conflicts with professional and job-related responsibilities of students. Students whose jobs require that they be absent from class must realize that it is their responsibility to determine whether such absence is permitted by the faculty member involved and to meet the professor's requirements for making up work missed, if the professor allows missed time to be made up.

## Make-up Policy

Make-up examinations are a privilege extended to students at the discretion of the instructor, who may grant permission for make-up examinations to those students who miss an exam as a result of a medical problem, personal emergency, or previously announced absence. On the other hand, instructors may choose to adopt a "no make-up" policy. Students should refer to the instructor's make-up policy in the course syllabus and if no mention is made therein, should inquire directly. A make-up test fee may be assessed when a student is permitted to make up an announced test during the term or to take an end-of-term exam at a time other than the scheduled time. In either case, the make-up examination fee will be paid by the student at the Bursar's Office.

## Academic Standards

### Course Grading System

The Graduate School uses the following grading system:

**Superior performance:**

A+ = 4.00 quality points
A = 4.00 quality points
A- = 3.70 quality points

**Good performance:**

B+ = 3.30 quality points
B = 3.00 quality points
B- = 2.70 quality points

**Passing performance:**
C+ = 2.30 quality points
C = 2.00 quality points
C- = 1.70 quality points

**Failure:**
F = Zero quality points

**Withdrawal from a course:**
W = Zero quality points

**Incomplete:** *(See rules below regarding incomplete courses.)*
INC = Zero quality points

**Thesis students who have not completed work during the term in which they originally registered:**
T = Zero quality points
(Students must complete the work within the time limit for completion of the degree.)

**Audit: indicates that a student registered for and attended a class but received no credit toward any degree.**
AU = Zero quality points

**For Pass/Fail courses:**
**Pass:** carries credit hours toward the degree. Use limited to thesis, Executive MBA, and EMSEM courses.
P = Zero quality points

**Pass with distinction:** carries credit hours toward the degree. Use limited to Executive MBA and EMSEM courses.
P+ = Zero quality points

**Failure:**
F = Zero quality points

**For non-credit courses:**
**Satisfactory performance in a noncredit course**
S = Zero quality points

**Unsatisfactory performance in a noncredit course:**
U = Zero quality points

Any grade change from one letter to another must be in accordance with procedures adopted by the Faculty Senate.

## Student Access to Final Grades

Final grades in each subject will be available online soon after the close of each term, provided that all financial obligations have been met and no other holds are in place.

## Incomplete Coursework

A grade of Incomplete (INC) is given only in special circumstances and indicates that the student has been given permission by the instructor to complete the work for the course with the same instructor after the end of the trimester or term. If a student is required to attend the class sessions for the course in a subsequent term, tuition must be paid for this second attendance.

Master's-level students who receive a grade of Incomplete (INC) should complete the work within three months after the end of the term in most cases. However, in extenuating circumstances, master's-level students may have a longer time period specified by the instructor, and not to exceed one year, to complete the work required for the course and have a grade submitted to the Registrar/Graduate Records.

Any exception to the one-year time limit must be in accordance with procedures adopted by the Faculty Senate.

## Quality Point Ratio

The academic standing of each student is determined on the basis of the quality point ratio (QPR) earned each term. Each letter grade is assigned a quality point value. The quality point values are shown above under "Course Grading System."

The quality point ratio is obtained by multiplying the quality point value of each grade by the number of credit hours assigned to each course as listed in the catalog, then dividing the sum of the quality points earned by the number of credit hours attempted in courses for which a grade of A+ through C- or F is awarded. A cumulative quality point ratio is obtained by calculating the quality point ratio for all courses taken at the University of New Haven which are part of the degree program.

## Academic Probation

Satisfactory progress is defined as a cumulative QPR of 3.0 or greater. Any student whose cumulative QPR is below 3.0 will be placed on academic probation and will be required to obtain written permission from the program coordinator prior to registering for additional coursework. The program coordinator or designee may provide written conditions, beyond specifying the current term course registration, which would be included in the student's academic record.

## Dismissal

A student whose cumulative QPR is below 2.7 after completion of 15 credit hours will be dismissed from the Graduate School.

Any student who has been dismissed may submit an appeal to the Associate Provost for Graduate Studies. If the appeal is granted, written conditions for the student must accompany the permission to continue in the Graduate School. These would be included in the student's academic record.

## Repetition of Work

A student may repeat a course. The grade received in the second attempt will supersede the original grade in the computation of the quality point ratio (QPR) if the second grade is higher. Both grades remain on the transcript. The course may be used only once for credit toward the requirements for completion of the degree program.

## Awarding of Degrees

The university awards degrees three times a year, at commencement ceremonies in January and in May and without formal ceremony in August. A cumulative quality point ratio of 3.00 and completion of all program and university requirements are required for graduation and the conferring of master's degrees. All students must file a graduation petition form in order to have their names placed on the list of potential graduates.

A cumulative quality point ratio of 3.30 in doctoral coursework and satisfactory completion of the written and oral doctoral comprehensive examinations, followed by successful completion and defense of the doctoral dissertation, are required for graduation and the conferring of the doctoral degree. All doctoral candidates must also file a graduation petition form in order to have their names placed on the list of potential graduates. Students completing their degree requirements at the end of the fall term will receive their degrees in January. Students completing their degree requirements at the end of the winter term will receive their degrees in May. Students completing the requirements for their degrees at the end of the spring term or the summer session may be awarded their degrees at the end of August and may request permission from the Registrar to participate in the formal graduation ceremonies at the following January commencement.

## Petition for Graduation

Candidates for the January commencement must file a graduation petition with the Graduate Records Office no later than October 15. Candidates for the May commencement must file no later than March 1. Candidates whose degrees will be awarded in August must file no later than June 15. Students completing the 5-year BS/MS program in Environmental Science, the MBA/MPA dual-degree program, or the MBA/MSIE dual-degree program must fill out two graduation petition forms (one for each degree). They will pay the full graduation petition rate for the first degree, plus a reduced rate for the second degree to be awarded at the same commencement date. (See the website for the current petition fee rates.) Graduation petition forms are available in the Graduate Records Office. Payment of the graduation fee must accompany the petition. A candidate who does not complete all the requirements for graduation before the deadline, after having filed the petition to graduate and paid the fee, will have to petition again at a later date. At that time, only the refiling fee will be charged. All financial obligations to the university must be met prior to graduation.

## Time Limit for Completion of Degree

A student must complete all the requirements for the master's degree or certificate within five years of the date of completion of the first course following formal application to the degree program. Any extension of the time limit for completion of the degree can be granted only after approval by the appropriate program coordinator and the Associate Provost for Graduate Studies.

Students who reach the five-year limit with fewer than 24 graduate credits completed at UNH will be required to apply for readmission to their programs, rather than for an extension. Students readmitted to a graduate program will begin the five-year time limit again and will be subject to the rules of the Graduate Catalog in effect at the date/time of readmission.

Students enrolled in the doctoral program must complete all coursework, pass the doctoral comprehensive examinations, and successfully complete and defend the doctoral dissertation within eight years of the date of completion of the first doctoral course.

## Residency Requirements for Master's Degrees

Degree programs have a 30-graduate-credit residency requirement, with the exception of the MBA/MSIE and MBA/MPA dual degree programs, which have a 60-graduate-credit residency requirement. Credits toward the residency requirement may be earned at the main campus, at the off-campus locations, or through UNH distance learning courses. Credits applied toward the requirement for one graduate degree may not be counted toward the residency requirement for another degree. In other words, completion of a minimum of an additional 30-graduate-credit residency requirement is necessary for those students who plan to complete a second master's degree program. The university policies for transfer of credit and waiver of courses apply in the same manner to candidates for a second master's degree as to those enrolling in their first master's program.

## Full-Time Study

A full-time course of study at the master's level is defined as enrollment for nine credit hours in the current term. Required non-credit courses (e.g., E 600) count toward full-time study. Under certain circumstances the program coordinator and the Graduate School administration may approve a reduction in credits. For international students who are required to maintain full-time enrollment for their immigration status, full-time doctoral study may be continued as long as their dissertation advisor, department chair, and/or director of the doctoral program certify that the student is maintaining continuing registration and making satisfactory progress toward completion of the comprehensive written/oral examinations and/or dissertation required for the doctoral degree.

A student who wishes to enroll for more than 12 graduate credits/four courses in a given trimester must secure the permission of the program coordinator. In general, full-time enrollment is available in all master's degree programs except the human nutrition master's degree and the graduate certificates. It is important to note that all graduate programs may also be pursued on a part-time basis.

## Part-Time Study

Part-time study at the master's level is defined as registration for fewer than nine credit hours in the current term. Half-time study at the master's level is defined as registration for a minimum of five credit hours in the current term. Registration for fewer than five credit hours qualifies as less than half-time study. Certificate programs may have limited scheduled course offerings and, therefore, are generally pursued on a part-time basis. International students with F-1 or J-1 immigration status may not enroll in study leading to the MS in Human Nutrition or only to a certificate, because these are part-time study plans.

## Transfer Credit

Transfer credit may be given for applicable graduate courses taken at other regionally accredited institutions (or ones recognized as such by the university)

prior to matriculation at the University of New Haven, subject to the following conditions:

- the courses were at the graduate level,
- each grade was B- or better, and
- the course did not fulfill requirements for any other degree already earned by the student.

## Coordinated Courses

Graduate students currently matriculated at the university must secure written approval before taking courses at another institution if they wish to transfer credit(s) into their UNH programs. Forms are available in the Graduate Records Office for this purpose. In all cases, an official transcript must be received directly from the institution where the course was taken and placed on file at UNH before transfer credit will be awarded. Transfer credits are not included in courses used to establish a student's QPR or residency requirement at the University of New Haven.

## Waiver of Courses

Some programs permit waivers of core courses on the basis of undergraduate or graduate courses taken at accredited institutions. Waivers of elective courses and/or concentration courses are not permitted, nor are waivers based on experience. In such cases, substitution of a more advanced course may be allowed. For a course to be waived, a student must first secure the written approval of the program coordinator, the department chair, or a faculty member acting for the chair in the department in which the waiver is requested. Waiver requests should be submitted in writing to the program coordinator. Even if a waiver has been granted, a student who wishes to take a waived course for review or as a refresher course may do so. However, refunds will not be granted for courses taken and subsequently waived.

## Crediting Examinations

Under certain circumstances, students who have independent knowledge of a specific course may apply for permission to take a crediting examination in lieu of taking the course. To qualify for a crediting examination, the student must have taken a similar course at either the graduate or undergraduate level; completed the equivalent work in non-credit training courses; or had extensive, related, on-the-job experience. Crediting examinations are subject to the following conditions:

- if the student passes the examination, a grade of P is awarded,
- the crediting examination is for required courses only (not concentration courses or electives),
- the credits awarded by examination do not count toward the residency requirement, and
- the crediting examination cannot be taken in the student's last trimester of study.

Permission to take a crediting examination must be granted by the department chair or program coordinator, the chair of the department in which the course is offered, and the Associate Provost for Graduate Studies. Crediting Examination Permission Forms are available from the Graduate Records Office. Once permission has been granted and the crediting examination fee of $300 paid, the examination is administered and graded by a full-time faculty member designated by the chair of the department that offers the course.

## Prerequisites

Students are expected to meet the prerequisite requirements for each course taken. Exceptions must be approved by the course instructor and the student's advisor or program coordinator. *Credit may be denied to a student who takes a course without the prerequisites.*

## Dropping/Adding a Class

A student who wishes to make a change in a class must refer to the instructions in the printed schedule. Drop/Add forms are available online and from the Graduate Records Office. Written permission of the instructor is required to add a class after the first class meeting. If a student withdraws from a class after the first class meeting, the tuition refund policy is applied.

## Comprehensive Examinations

Students who are required to take comprehensive examinations in order to complete their degree programs must obtain the appropriate comprehensive examination approval form(s) from the Graduate Records Office, secure the necessary approvals, and pay the required fees, if applicable. Students should confirm arrangements for comprehensive examinations with the program coordinator.

## Research Projects, Independent Study, and Internships

All academic programs leading to a master's degree require the completion of a capstone work – a thesis, a substantial research or other special project, or a comprehensive examination. Students must have the written approval of the advisor, department chair, and program coordinator prior to enrolling for the capstone program research or project. The required approvals must be on the appropriate forms, which are printed in each of the graduate trimester schedule booklets, and are also available from the university website and at Graduate Records. In some programs, the capstone research or special project is structured as an internship or independent study, the approval for which is covered by the aforementioned process. However, some programs permit or encourage internships or independent studies under the supervision of a faculty advisor as distinct from the capstone requirement. Prior approval for these is also required, using forms available from Graduate Records, the website, or the registration booklet. A student may not register for more than a total of six credits of independent study/internship within a degree program. An independent study/internship proposal must be approved by the student's advisor and/or program coordinator as well as the coordinator or chair of the department offering the course.

Students preparing a report for their research or special project, internship, or independent study may be asked to follow the guidelines presented in the UNH *Dissertation and Thesis Manual* (2nd edition, 1998), copies of which are available in the Graduate Records Office, on the university website, and in the bookstore.

## Thesis

Preparation and completion of a thesis are optional for master's degree programs. A number of preliminary steps are required before registration for the thesis will be accepted by the Registrar. The student completes the Proposal for Thesis form (available online or at the Graduate Records Office), in which the proposed subject, hypothesis, and methodology are described. The student secures the approval signature of a faculty member who will serve as advisor. The student must also secure approval of the proposed thesis and thesis advisor from the department chair and/or program coordinator and the Associate Provost for Graduate Studies. Only after the Registrar has received the approved form will the student be permitted to register for the thesis. A thesis will carry no fewer than six academic credits taken over no fewer than two academic terms. A preliminary draft must be presented to the advisor at least 75 days prior to commencement. Upon approval by the advisor and the program coordinator, unbound copies are presented to the Associate Provost for Graduate Studies. A date and time will then be scheduled by the thesis advisor for the thesis defense before the student's thesis committee and the Associate Provost for Graduate Studies or his/her designee. Successful defense of the thesis must be completed at least three weeks prior to the date of commencement. Students must complete and defend the thesis within the time limit for completion of the degree.

After successful defense and the approval of the thesis by the Associate Provost for Graduate Studies, thesis credit is awarded, and final, unbound copies of the thesis are deposited with the Associate Provost for Graduate Studies to be forwarded for binding at the university library, where the thesis becomes a part of the permanent collection. Additional copies may be required by the department or the program coordinator.

For guidance in the preparation of theses, graduate students should consult the university's *Dissertation*

*and Thesis Manual* (2nd edition, 1998), copies of which are available in the Graduate Records Office, on the university website, and in the bookstore. Questions not resolved by the instructions should be settled in consultation with the advisor and by reference to a standard style manual.

## Graduate Certificates

The Graduate School offers a number of graduate certificates designed as options for those having a baccalaureate degree, or a master's degree, who want to enroll in a part-time, short, coherent course of study at the graduate level. Those who may not yet be ready to commit themselves to a full-length graduate program, as well as those who already hold a graduate degree but want to pursue additional work in the same or another field, may find that a certificate provides the perfect alternative.

Students applying to the Graduate School to enter a graduate certificate program must complete the Graduate School application form, submit official transcripts showing completion of the undergraduate/baccalaureate degree, and also submit two letters of recommendation. Inasmuch as the certificates are not graduate degrees, students may transfer credits earned toward a certificate into a master's program at any time, subject to the requirements of the master's degree, the decision of the program coordinator, and acceptance into the master's program. Although students who complete the requirements for a graduate certificate do not attend commencement, a certificate is awarded by the university to each student who qualifies.

Upon completion of the course requirements, a petition form requesting issuance of the certificate must be submitted to the Graduate Records Office following payment of the certificate petition fee. Also, students enrolled in master's degree programs who meet the qualifications for the awarding of a certificate during pursuit of the master's degree, but prior to petitioning for graduation, may submit a petition for certification. The coursework is reviewed by the certificate advisor and the graduate Registrar; and, if the work is found to be complete and satisfactory, the appropriate certificate will be mailed to the student. A minimum QPR of 3.00 is required as satisfactory performance in courses taken at the university to qualify for the awarding of a graduate certificate.

### Certificate Requirements

Required coursework usually consists of 12 to 20 credits of graduate study, depending on the subject area selected. Students should contact the faculty advisor for the selected certificate for assistance in planning the course of study. A student may seek approval from the academic advisor for a maximum of one course of transfer credit from another institution or program to be used to satisfy the requirements of the certificate. Course substitutions may be granted by the certificate advisor. Course credits used to satisfy the requirements for one certificate may not be used toward the completion of a second certificate. Students must meet all course prerequisite requirements. Credits for courses taken as prerequisites for certificate courses must be taken outside/in addition to the certificate requirements.

## Academic Advising

It is the student's responsibility to select courses in accordance with prerequisites, the advisor's recommendations, the departmental plan of study (if required), and the requirements for the degree. Students needing further explanation of program requirements or course sequencing should request academic advisement. Appointments for academic counseling should be scheduled through concentration advisors or program coordinators. Advisement sessions are held prior to each trimester. A student is not required to file a formal plan of study with the Graduate School. It is the student's responsibility to meet the stated requirements for the degree.

## Grievance Procedure

A formal policy for the handling of student grievances is available in the office of the university ombudsman.

## Notification of Family Educational Rights and Privacy Act (FERPA)

The Family Education Rights and Privacy Act (FERPA) affords students certain rights with respect to their education records, as follows:

1. **The right to inspect and review the student's education records within 45 days of the day the university receives a request for access.** Students should submit to the Registrar, dean, head of academic department, or other appropriate official written requests that identify the record(s) they wish to inspect. The university official will make arrangements for access and notify the student of the time and place where the records may be inspected. If the records are not maintained by the university official to whom the request was submitted, that official shall advise the student of the correct official to whom the request should be addressed.
2. **The right to request the amendment of the student's education records that the student believes are inaccurate or misleading.** Students may ask the university to amend a record that they believe is inaccurate or misleading. They should write the university official responsible for the record, clearly identify the part of the record they want changed, and specify why it is inaccurate or misleading. If the university decides not to amend the record as requested by the student, the university will notify the student of the decision and advise the student of his or her right to a hearing regarding the request for amendment. Additional information regarding hearing procedures will be provided to the student when he or she is notified of the right to a hearing.
3. **The right to file a complaint with the U.S. Department of Education concerning alleged failures by the University of New Haven to comply with the requirements of FERPA.** The name and address of the office that administers FERPA are: Family Policy Compliance Office, U.S. Department of Education, 400 Maryland Avenue SW, Washington, DC 20202-4605.

Independent of the FERPA requirement, university policy relating to privacy of student academic and disciplinary records is as follows: Faculty and/or staff disclosure to others (including parents or guardians) of student academic information or disciplinary action requires a prior release from the affected student. Such a release should be obtained using a standard UNH form which will be filed with the student's academic record (Registrar) or/and with the office of the Dean of Students.

## Diversity Policy

The University of New Haven is committed to achieving a diverse and pluralistic community which reflects the multiracial and culturally diverse society in contemporary America. The Diversity Committee (a standing committee of the university) has been established to guide the university in implementing the Diversity Policy. The university will work toward attracting and retaining a diverse faculty, staff, and student body for the purpose of creating a pluralistic scholarly community. The Committee will assist the administration in the development and implementation of programs and policies that support an enriched educational experience for a diverse university community. The University of New Haven does not discriminate in admissions, educational programs, or employment against any individual on account of that individual's gender, race, color, religion, age, disability, sexual orientation, or national or ethnic origin.

## Drug-Free and Smoke-Free Environment

In accordance with federal law concerning a drug-free campus environment, relevant university policy and regulations are provided for all current students and employees. Upon request, information is available from Student Affairs.

### Smoke-Free Policy

In order to provide a healthful, comfortable, and productive campus environment for all UNH faculty, staff, students, and guests, the University of New Haven has adopted a SMOKE-FREE policy.

NO SMOKING will be allowed in any campus administrative, academic, or recreational building. This restriction will apply to all UNH offices, classrooms, hallways, stairwells, restrooms, dining facilities, conference/meeting facilities, athletic facilities, and any other public spaces within these buildings. Smoking is limited to areas which are twenty feet away from all entrances to university buildings. Signs placed on the entrances inform everyone of the policy, and ash receptacles are placed twenty feet away from all entrances. This is not meant to be punitive to those who smoke but only to allow everyone to enter our buildings without breathing in unwanted smoke. It will be our responsibility as university community members to gently inform those who are not following the rules to please move away from the entrance. Smoking in the residence halls will be restricted to rooms, suites, and apartments that have been designated as allowing smoking as agreed upon by the roommates. Smoking will not be allowed in lobbies, hallways, laundry rooms, meeting rooms, community rooms, or any other public spaces within the residence halls.

Cooperation is expected from all members of the university and their guests. To register a complaint against a non-compliant individual, contact:

Student Affairs Office: 932-7199
Human Resources Dept.: 932-7240

This policy will apply to all UNH facilities in West Haven and Southeastern operations, as well as to off-campus class sites and other locations where UNH may, in the future, establish operations.

## Student Right-to-Know and Campus Security Act

In accordance with Connecticut's Public Act 90-259 concerning campus safety and the 1990 federal law PL101-542: The Student Right-to-Know and Campus Security Act, all colleges and universities receiving state and federal financial assistance are required to maintain specific information related to campus crime statistics and security measures, annually provide such information to all current students and employees, and make the data available to all prospective students and employees upon request.

At the University of New Haven, the required information is compiled by the University Police Department and is published annually.

## Policy on Cell Phones and Beepers

Ringing cell phones and beepers are very disruptive to classes, presentations, productions, and other public events. As a matter of courtesy, the University of New Haven requests that all communication devices be turned off or disabled during all classes or public events. Individual discretion should be used in determining when exceptions should be made related to emergency personnel or situations.

# TUITION, FEES, AND FINANCIAL AID

Following are the tuition, fees, and charges which will be in effect for the fall 2007 term. The university reserves the right, at any time, to make whatever changes it may deem necessary in admission requirements, fees, charges, tuition, policies, regulations, and academic programs prior to the start of any class, semester, trimester, or session.

## Master's Tuition

Tuition, per credit hour ..... $630
Tuition, per 3-credit course ..... $1890
Executive MBA, complete program ..... $49,840
Executive MS in Engineering Management, complete program ..... $40,500
Human Resource Management Certificate (12 credits) ..... $9,000
Industrial and Organizational Psychology (2 years) ..... $36,000
Master's in Education Internship (1 year) ... $11,520
MBA Cohort, complete program ..... $36,000
MPA (2 years) ..... $31,500
MS Computer Science Cohort ..... $32,670
MS Labor Relations Cohort ..... $22,500
MS Taxation Cohort ..... $22,500
Auditor, per credit ..... $150
E 600, English Language Workshop ..... $1890

## Master's Nonrefundable Fees

Application fee ..... $50
Executive MBA application fee ..... $50
Auditor application fee ..... $50
Auditor course fee for UNH alumni/ae, per credit ..... $100
Continuing registrarion fee ..... $150
Co-op registration fee, full-time ..... $150
part-time ..... $75
Graduate Student Council fee, per term ..... $20
Graduation petition fee ..... $110
Late filing fee, after March 1 (May), June 15 (August), October 15 (January) ..... $50
Graduation refiling fee ..... $50
Petition fee for two/dual degrees ..... $185
Health insurance fee (per year, all full-time domestic students) ..... $228
International student acceptance fee ..... $200
International student health insurance premium (per year) ..... $700
Laboratory fees ..... $60 – $310
Late payment fee (after scheduled due date)* .... $50
Late registration fee, current students ..... $25
Graduate certificate fee (payable upon completion of courses) ..... $50
Technology fee, per trimester ..... $20
Comprehensive examination fee ..... $300
Crediting examination fee ..... $300

## Doctoral Tuition and Nonrefundable Fees

Dissertation tuition, per course ..... $1160
Graduate Student Council fee, per term ..... $20
Continuing registration fee ..... $710
Qualifying examination fee (where applicable) ..... $300
Doctoral graduation petition fee ..... $150
Dissertation copyright and filing fee ..... $125

**A late fee of $50 plus 1.5 percent per month penalty will be assessed on outstanding balances.*

## Technology Fee

The technology fee paid by all students will afford each student a personal copy of Microsoft Office, which can be used during study at UNH and retained upon graduation from the university. Other benefits of the technology fee include upgrades to computers in the library and campus laboratories and to increased student technology support.

## Payment

A deposit of $40 per course must be paid at the time of registration; the balance is due no later than the end of the first week of classes. The deposit is not refundable should you decide not to enroll in the courses for which you originally registered. If payment is made by American Express, MasterCard, or VISA, please include your card number, expiration date, and 3-digit security code.

For students who have not completed payment of tuition and fees by the end of the first week of classes, a charge of $50 plus 1.5 percent per month will be assessed on outstanding balances. An invoice for this final payment will not be sent through the mail until after the due date has passed and late fees have been assessed.

*Note:* A tuition receipt from the Bursar's Office does not guarantee a reserved seat in class, only that tuition and fees have been paid.

Students are responsible for payment of tuition to the university, even though they may be eligible for their employer's tuition reimbursement plan. Students are responsible for making their own arrangements with their employers for reimbursement.

The university withholds the giving of grades, the awarding of diplomas, the issuance of transcripts, and the granting of honorable dismissal to any student whose account is in arrears. The university accepts American Express, MasterCard, and VISA.

## Withdrawal

A student may withdraw from a course through the seventh week of the trimester without a notation on the transcript. After the seventh week withdrawal from a course may be granted only by the instructor, and a "W" is recorded on the student's transcript at the end of the term when grades are recorded.

To be eligible for a cancellation or refund of tuition charges, students must formally notify the Registrar of their intention to withdraw by completing the university withdrawal form and submitting it to the Registrar by mail or in person. The date of the postmark on the mailed withdrawal forms, or the date of submission on those brought in person, determines the amount of the refund, if any, due the student.

## Refunds

The refund policy for graduate students who withdraw from any course or from any program (with the exception of the Executive MBA, EMSEM, the MBA cohort, and the Human Nutrition programs) is as follows: 100 percent cancellation of tuition upon formal withdrawal prior to the first regularly scheduled class meeting, 80 percent cancellation of tuition upon formal withdrawal prior to the second regularly scheduled class meeting, 60 percent cancellation of tuition upon formal withdrawal prior to the third regularly scheduled class meeting, 40 percent cancellation of tuition upon formal withdrawal prior to the fourth regularly scheduled class meeting, 20 percent cancellation of tuition upon formal withdrawal prior to the fifth regularly scheduled class meeting. No cancellation will be made after the fifth regularly scheduled class meeting. Any refund amount will be credited to the student's UNH account or, if requested, may be credited to the student's credit card account or issued directly as a check.

No refunds will be made for courses taken and subsequently waived.

The refund policy for the Executive MBA program is as follows: for EMBA students who withdraw after completion of one module or less, one-half of the year's tuition will be cancelled.

Information regarding the refund policy for the Human Nutrition program is available from the Director.

## Financial Aid

The University of New Haven offers a comprehensive program of financial assistance to qualified students, including assistantships, fellowships, and student loans. Application procedures for financial assistance are detailed below. Applications are available from the Financial Aid Office.

Financial aid award decisions are made after careful consideration of a student's application for assistance. Eligibility for financial aid is based on an applicant's financial need. Need is determined by subtracting the Expected Family Contribution (EFC), as determined by the federal "needs analysis" formula using the financial information provided on the Free Application for Federal Student Aid (FAFSA), from the Cost of Attendance. In calculating need, the Financial Aid Office attempts to consider all aspects of a student's financial circumstances and to meet the need of aid applicants through a package of assistance, generally consisting of a combination of subsidized and unsubsidized loans and, when applicable, merit-based awards; i.e., assistantships and fellowships. Need-based financial aid programs are available to matriculated students who are U.S. citizens or eligible non-citizens who are matriculated and enrolled on at least a half-time basis. Merit-based programs are open to all matriculated students.

Need-Based Programs
(U.S. citizens and eligible non-citizens only)

- Federal Stafford Loans—The Federal Stafford Loans are need-based loans. Eligible students may borrow up to $8,500 per academic year. The interest rate for new borrowers is variable fixed at 6.8 %. The interest rate during in-school, grace, and deferment periods is based on the 91-day T-Bill rate plus 1.70 percent and was 2.77 percent during the 2005-2006 academic year. The interest rate during all other periods is based on the 91-day T-Bill plus 2.30 percent during 2005-2006. The interest rate is capped at 8.25 percent. The interest is federally subsidized. Repayment begins 6 months after graduation or withdrawal from the university or enrollment below half-time status. Exit interviews must be conducted prior to a student's graduation or withdrawal.

Non-Need-Based Programs
(U.S. citizens and eligible non-citizens only)

- Unsubsidized Federal Stafford Loans—A loan program created by the Higher Education Amendments of 1992 for students who do not qualify, in whole or in part, for subsidized Federal Stafford Loans. The terms for unsubsidized loans are the same as the terms for subsidized Stafford Loans except for the following:

  Interest accrues while the student is in school and during periods of deferment. The federal government does not pay the interest. The student can make monthly or quarterly payments to the lender, or the student and the lender may agree to add the interest to the principal of the loan (capitalization).

Note: A student must submit a complete financial aid application and be considered for a subsidized Federal Stafford Loan before the Financial Aid Office can process an Unsubsidized Federal Stafford Loan. Eligible students may borrow up to $12,000 in unsubsidized loan funds per academic year.

Merit-Based Programs
(open to all matriculated students)

- Assistantships— Assistantships are competitive appointments available to full-time students. Graduate assistants may work up to 20 hours per week and receive an hourly compensation as well as 50% tuition support. Applications for assistantships are made available in early spring for the following year. Applications and further information may be obtained via the university website. The majority of assistantships are awarded as part of the admissions process. Students will be notified at the time of admission to the university if they have qualified for an assistantship. An open application process for any unfilled positions is held annually in May. Appointments are made for the academic year starting in September.
- Fellowships— Fellowships are competitive awards made to continuing students on the basis of outstanding academic achievement. Students who have earned at least 24 credits at UNH with the highest levels of academic performance in their chosen fields automatically become eligible for considera-

tion. Recommendations for fellowships are also sought from the faculty. Students may nominate themselves by writing to the Associate Provost for Graduate Studies. Awards are made by a faculty committee for the academic year starting in September. (No financial aid application is required).

### Alternative Financing Options

Alternative financing options are available to assist students in paying for their educational expenses up to their Cost of Attendance. Eligibility for supplemental loans is not based on financial need or a financial aid application. Generally, students must be enrolled at least half-time and must undergo a credit review to qualify. The Graduate PLUS loan is a federal alternative loan with a fixed rate of 8.5% which students may apply for if they have already been approved for and awarded their Stafford loans. In addition, there are several other alternative loan options with private lenders. More information regarding these loans and financing options is available in the Financial Aid Office.

### Application Procedure

Applications for graduate financial aid are accepted on a rolling basis throughout the academic year. However, to insure that aid is awarded in a timely manner and is available at the beginning of each trimester, students should adhere to the following application deadlines. Students applying for need-based and non-need-based assistance must submit the documents listed below by the following deadlines:

May 1 for the Fall trimester/academic year
October 15 for the Winter trimester
January 15 for the Spring trimester.

Note: *International students* who are applying for Graduate Assistantships need to complete only the UNH Non-Need-Based Financial Aid Application. This form is available from the Financial Aid Office.

- **University of New Haven Financial Aid Application**— This form must be completed fully and submitted to the university's Financial Aid Office. Students may access this form via the university website.
- **Free Application for Federal Student Aid (FAFSA)**— This form is required to apply for financial aid from federal student financial aid programs. The UNH code number is 001397. Students can complete the FAFSA on the Internet at *www.fafsa.ed.gov,* or paper applications are available at UNH or any college financial aid office.
- **Verification**— A student may be selected for a process called verification by submitting an aid application and completing the Free Application for Federal Aid. Selected students are required to submit a signed and completed verification worksheet (provided by the university) and signed copies of their federal income tax return (and those of their spouses, if applicable), including all pertinent schedules and W-2 forms.
- **Additional Information**— Other forms and documents may be requested from you as your aid application is reviewed.

## Financial Aid Refund Policy

Students who withdraw from courses prior to the end of the fifth week of the trimester may be entitled to a full or partial refund of tuition charges. Refunds of charges and financial aid will be based on the institutional refund policy, as described in the academic policies section of the university catalog, and on the Return of Title IV Funds calculation, as required by Section 484B of the Higher Education Act. Federal regulations require that any unearned Title IV aid be returned to the program(s) that provided the funds.

## Return of Title IV Funds

A withdrawal requires the university to calculate the amount of unearned aid a student has received. The university must:

- Determine the student's official withdrawal date as documented in the Registrar's Office. The withdrawal date is used to determine the percentage of the payment period completed and therefore the amount of aid a student earned. Students who have completed more than 60% of the term are not subject to the federal calculation.
- Determine the amount of aid earned by the stu-

dent. The university must calculate earned aid by multiplying the total aid disbursed or which could have been disbursed (excluding Federal Work Study) by the percent of the payment period the student completed.

- If less aid has been disbursed than a student has earned, then a post-withdrawal disbursement must be made. The university will notify the student in writing within 30 days of the withdrawal date that a post-withdrawal disbursement is available. The student must respond within 14 days of notification in order to receive the funds. The student may accept all or part of the post-withdrawal disbursement. If more aid was disbursed than earned, then the university, the student, or both must return all unearned aid in a specific order:

  1) Unsubsidized Stafford Loans
  2) Subsidized Stafford Loans
  3) Federal Perkins Loan
  4) Federal PLUS Loan
  5) Federal Pell Grants
  6) Federal Academic Competitiveness Grant
  7) Federal SMART Grant
  8) Federal SEOG
  9) Other Title IV assistance for which return of funds is required.

Students are responsible for repaying all unearned aid a school is not required to return, as well as any balance created on their university bursar account by the application of the Title IV return of funds formula. The university will notify the student in writing within 30 days of determining an overpayment. Students must repay as follows:

- Loans - repayment according to terms of the loan
- Grants - repayment is 50% of unearned grant.

Students who owe Title IV grant repayments have 45 days to:

- Repay in full
- Make arrangements to repay the university
- Make arrangements to repay the U.S. Department of Education.

Students who fail to take positive action to repay their grants will be reported to the Department of Education and the National Student Loan Data System (NSLDS) immediately after the 45-day period has elapsed. Additional information and examples of refund calculations are available in the Financial Aid Office.

### Academic Requirements for the Retention of Financial Aid Eligibility

Students must be making satisfactory academic progress and be in good academic standing in order to be eligible to receive financial aid. Graduate students must successfully complete all the credits for which financial aid has been awarded, as indicated on their financial aid award letter. "Successful completion" is defined as the receipt of a passing grade (A to D-). Grades of F, W, U, DNA, or INC are not considered successful completion. All graduate students must maintain a minimum 3.0 cumulative quality point ratio (QPR) in order to be in good academic standing.

## Cooperative Education

Cooperative education programs at the University of New Haven provide an opportunity for students to combine or alternate periods of career-oriented, temporary work assignments with their academic programs. Co-op work assignments for graduate students are developed on an individual basis. This enables students to integrate the experiential learning of the workplace with the theoretical work of the classroom. Resume writing assistance and interviewing information are available in preparation for co-op program participation. Co-op employers include large corporations, small businesses, government agencies, and nonprofit organizations. Graduate students become eligible to participate in the co-op program after completion of nine credit hours of graduate study. Certain additional requirements must also be met for eligibility for cooperative education. Co-op work assignments may be full-time or part-time, and of varying duration. Co-op assignments carry no academic credit. Students who are interested in registering for Co-op should contact the Co-op Coordinator in the academic college which houses their program of study.

# ACADEMIC AND STUDENT SERVICES

## Academic Services

### Campus Copy, Inc.

Campus Copy is a full-service copy, type, and print shop located in the basement of Maxcy Hall on the main campus. Campus Copy offers a variety of services at reasonable prices, including resume composition, word processing, desktop publishing, photocopying, full-color copying, scanning, faxing, and binding. Campus Copy, Inc. is independently owned and operated. For more information, call (203) 931-9844.

### Campus Bookstore

The Campus Store provides all required texts, new and used, for courses at the university. Textbooks used during the trimester may be sold back to the store throughout the year. The bookstore staff will also place special orders for any book in print.

The Campus Store carries all related supplies, greeting cards, imprinted clothing and gifts, candy, and a selection of magazines and paperbacks. It also handles orders for class rings and school chairs.

The bookstore will ship books and other items to any home or business address. Special educational discounts on computer software are available at **efollett.com** to faculty and students who have a current UNH campus ID Card. A computer software catalog is available; call (203) 933-4000.

Students can order books online to be shipped or reserved in the bookstore: simply go to **efollett.com** or **unh.bkstr.com** to order.

### Center for Dispute Resolution

The Center for Dispute Resolution at the University of New Haven is a focal point for the interdisciplinary study and practice of dispute resolution. The Center offers conflict management services to individuals and to businesses, institutions, governmental agencies, and community organizations. Services include mediation, design of conflict management systems, consultation, and training. Through educational programs for students and the community-at-large, the Center also strives to advance the understanding and application of alternative means of dispute resolution, including mediation.

### Center for Family Business

The mission of the Center for Family Business, founded in 1994, is to strengthen family firms, the backbone of Connecticut's economy. The University of New Haven has as its business partners in this endeavor the accounting firm of Bailey, Schaefer and Errato, LLC; Sequence Financial/MassMutual; Gowrie, Brett & Young; U.S. Trust Company; and the law firm of Wiggin and Dana.

The Center for Family Business holds conferences and forum groups throughout the year for its membership, presenting programs by nationally recognized speakers. The Center provides access to a national family business network and to business programs and services, consultations, and seminars.

### Center for Learning Resources

The Center for Learning Resources (CLR) provides free tutoring and writing skills assistance to students seeking extra help with their studies. The tutoring staff, more than twenty-five tutors in all, is comprised largely of experienced instructors who hold advanced degrees in their respective fields and who are committed to aiding the learning process. Our highly competent graduate and undergraduate student tutors are chosen based on the recommenda-

tions of their professors. Tutoring is available six days a week, following the undergraduate calendar. The CLR is located in Maxcy Hall rooms 106-110.

The CLR is comprised of three labs: the **Mathematics, Science, and Business Lab**; the **Writing Lab**; and the **Computer Lab**. The Math Lab offers drop-in tutoring for mathematics, science, and business courses. The Writing Lab tutors are available by appointment and for drop-in help with all writing assignments. The Computer Lab is supervised by a graduate student tutor and provides access to Microsoft software, SPSS, math tutorials, and Internet research.

## Center for the Study of Crime Victims' Rights, Remedies, and Resources

The UNH Center for the Study of Crime Victims' Rights, Remedies, and Resources is housed in the Henry C. Lee College of Criminal Justice and Forensic Sciences and supports initiatives that enhance the knowledge base concerning crime victims' rights and services. The Center's mission is to "improve rights and services for victims and survivors of crime by enhancing our knowledge and the transfer of knowledge from research to practice through education, training, technical assistance, and research opportunities for advocates, service providers, and allied professionals." These initiatives are variously statewide, regional, and national in scope. They include degree and certificate instructional programs; field and program evaluation research services; internships, fellowships, and visiting scholar programs; legal, legislative, and public policy analysis and advocacy; and publications, conferences, and symposia. The Center is also the university's link to the Joint Center for Violence and Victim Studies inter-university consortium. Information is available through the director's office.

## Information Services: Facilities

Information Services provides for the computing needs of both academic and administrative users. The university maintains a number of computing facilities. The primary, general-purpose computer lab is on the first floor of Echlin Hall and, like the CAEC Lab in Buckman Hall 225, is staffed evenings and weekends. The computers contain web browsers, Microsoft Office, statistical analysis, and other university-standard software. Additional labs, located throughout the campus, are discipline-specific and used primarily for instruction. Computers are also available for use in Marvin K. Peterson Library.

Special-purpose computing facilities include the CAEC lab (see above), the graphic art and design lab in Sheffield Hall, the Industrial Engineering CAD/CAM lab in Buckman 129, the Computer Science AT&T lab in Echlin 206, the AT&T multimedia lab in Buckman 227, the Electrical Engineering lab in Buckman 203, the Biology and Environmental Science (GIS) lab in Dodds 305, the Mechanical Engineering Instrumentation Lab in Buckman 223, the Math and Physics Department lab in Maxcy 216, the Hospitality and Tourism lab in Harugari 114, the College of Business lab in Dodds 103, the Internet Crime lab in Dodds 101, a faculty lab in Echlin 119, and the UNH Southeastern lab at Mitchell College in New London. For availability of these labs, contact the given department's administrative staff.

The hours for open labs change each semester and are posted on the door of each lab or may be ascertained by browsing http://intra (on campus only).

## Information Services: Technology Fee

The technology fee entitles each student to an educational-license copy of Microsoft Office, which may be picked up in the Student Support Office (Echlin 115) or the Campus Card Office (Echlin 114) or at other locations announced each term. Additional Microsoft software titles and anti-virus software are also available, at a $15-per-title fee payable at the Bursar's Office. Then, simply present your receipt when picking up the software. Other benefits of the technology fee include upgrades to library and lab computers, installation and support of the wireless network, and student tech support and staffing.

## Marvin K. Peterson Library

The Marvin K. Peterson Library, named in honor of a former university president and dedicated in 1974, includes three floors of reading space, an Information Commons, Jazzman's Café, group study rooms, stacks, and reference areas. Information is made accessible through manual as well as electronic retrieval methods. Computers with Internet access and the Microsoft Office Suite and SPSS are available for research purposes. Wireless networking is available in all areas of the library. Students and faculty can plug in their laptop computers to connect to the campus network at more than 100 ports available throughout the library's three floors. Materials are stored in a variety of formats including online, print, audio, video, microform, and CD-ROM or DVD.

The library's homepage is available via the web at http://library.newhaven.edu. It serves as a gateway to information and library services and includes the library's online catalog, which allows for both basic and advanced searching of library holdings. To borrow library materials, a valid UNH ID card must be presented at the Circulation Desk. Books already charged out can be renewed online. Recent additions to the collection are listed on the library's homepage. Library Guides, prepared by professional librarians, are posted. Interlibrary loan forms for students and faculty are available online. Electronic access to more than 19,000 full text electronic journal holdings is accessible from a link on the homepage. Faculty and students in their offices or residence halls or at home have access to a variety of commercial online databases on the library's homepage.

UNH subscribes to many online electronic databases in all subjects. Resources, including many full-text books and journal sources, are accessed in online databases such as LEXIS/NEXIS, ABI/INFORM, Criminal Justice Periodicals Index, Education Complete, Expanded Academic Index ASAP, Engineering Village and Compendex Web, FirstSearch, CCH Online, GPO Access, PsycARTICLES, ProQuest Computing, Psychology and Behavioral Sciences Collection, WestLaw, Hoover's, Science Direct, Reference USA, Country Watch, GPO on SilverPlatter, and IRIS.

The UNH library's collection includes more than 241,000 volumes, 1,400 print journal and newspaper subscriptions, electronic access to over 19,000 full-text journal and newspaper titles, 549,413 pieces of microfiche, 12,135 volumes of microfilm, and 162,385 paper U.S. Government Documents.

The main library is a U.S. Government Documents Depository Library and selects approximately one third of the U.S. government yearly output to support UNH programs.

UNH students may borrow materials from the Albertus Magnus College Library. Students who obtain a borrowing card from a Connecticut public library may borrow from other public libraries statewide. As a member of Online Computer Library Catalog (OCLC), UNH has access through interlibrary loan to the holdings of more than 9,000 member libraries' 76 million records. The library uses telefacsimile and electronic means to transmit articles and information between itself and other libraries across the country.

Students are assisted by professional reference librarians. One-on-one consultations are available to locate information for research papers and projects. Freshmen receive instruction in how to use a modern library. Subject-specific library orientations are available for upperclass and graduate students. Library instruction courses geared to international students are also provided.

Library guides, as well as selected instructional support resource materials, are provided; and a reserve collection is in place to support courses taught at UNH. Library Guides help facilitate access to information resources for effective research. Sample topics covered include Forensic Science, Psychology, National Security Resources, Dietetics and Nutrition, Criminal Justice, Biology, Dental Hygiene, Management Resources, an APA Style Guide, Citation Management in Databases, and an Introductory Research Guide.

## The UNH Foundation

The role of the UNH Foundation is to initiate, facilitate, and participate in programs and projects aimed at furthering the educational endeavors of the university.

The Center for Family Business is administered under the auspices of the Foundation. The Center for Family Business provides programs and services designed to meet the unique needs of those involved in family-owned and/or operated businesses.

The Center provides members with opportunities to learn from nationally acclaimed speakers on a wide variety of relevant topics. Members also enjoy opportunities to interact and network. The Center facilitates a variety of small-group forums for such segments of its membership as managers, leaders, successors, and women. Forum members meet monthly to discuss issues of importance to their group.

# Student Services

## Alumni Relations

Students are eligible for membership in the Alumni Association immediately upon graduation. Non-degreed students are eligible for membership upon completion of 12 graduate credit hours or 27 undergraduate credit hours. A one-time membership fee is included in the graduation petition fee. There are currently more than 40,000 eligible alumni.

Alumni Association members enjoy special privileges such as use of the library, special rates to audit classes, and access to UNH Online, the online network of over 40,000 graduates of UNH. Alumni can search the directory, review job postings and resumes, post class notes, sign up for a UNH email address, and more. Permanent lifetime membership ID cards are issued to Alumni Association members soon after graduation.

*UNH*, the alumni magazine, is mailed to all members regularly. Alumni Weekend, class reunions, an annual Scholarship Ball, estate planning seminars, and other educational and social events offer opportunities for continued contact with UNH and fellow alumni.

Regional alumni clubs across the nation offer additional opportunities for active involvement. Alumni clubs sponsor social and career networking receptions, seminars, family-oriented events, fund-raising, and sporting activities.

Alumni board members govern the association with the assistance of additional alumni volunteers. The board serves as an advisory group to the university, working to strengthen bonds by promoting communication between alumni and the UNH community.

## Athletics and Recreation

The David A. Beckerman Recreation Center (opening November 2007) is an invaluable tool for graduate students, adding to the vibrancy and appeal of scholarly life at the university. The state-of-the-art facility includes: a fitness center with aerobic equipment, weights, and televisions; two multi-purpose rooms for activities including yoga, step aerobics, and Pilates; two basketball courts; a multi-sport court for activities including rollerblading, roller hockey, volleyball, and indoor soccer; an elevated indoor running track; viewing areas above the playing courts; and a lounge area for relaxation and socialization. A fee may be required for use. Student IDs are required.

Full-time graduate students are eligible to take part in various intramural competitions, including activities such as football, table tennis, basketball, racquetball, softball, tennis, and volleyball, among others. The offerings also include activity classes such as yoga, tai chi, ballroom dancing, self-defense, and Pilates.

## Career Services Center

The mission of the Career Services Center is to contribute to the lifelong career advancement of students and alumni and to continued development of a vibrant network of alumni, students, faculty, and friends. The mission will be supported by the overarching goal of *"**EMPOWER**"ing* the university's constituencies through Education, Motivation, Personal development, Opportunities, Wisdom, Employment, and Reporting.

The Career Services Center provides services for students, alumni, faculty, and employers. These services include assisting with career planning and job searching, preparing and reviewing resumes,

cover letters, mentorship opportunities, and interviewing skills. Individual appointments may be scheduled by calling (203) 932-7342. The Career Services Center may also be contacted through email at jobs@newhaven.edu or through our website, www.newhaven.edu/careerservices.

## Counseling Center

The Counseling Center in the lower level of Sheffield Hall offers assistance and counseling to students with personal problems. The Center also offers testing, including learning disability evaluations and vocational interest testing. For students who do not know where to go for help with a problem, the Counseling Center serves as a resource for information and direction.

## Dental Center

The University of New Haven Dental Center is the clinical education site for the university's Dental Hygiene students. Student dental hygienists, under the supervision of licensed faculty, provide preventive dental services to the public, including dental examinations, prophylaxis (cleanings), oral hygiene instructions, fluoride treatments, pit and fissure sealants, and radiographs.

Fees are charged on a sliding scale, according to the client's UNH employee/student status. For more information or to schedule an appointment, call (203) 931-6028.

## Disability Services and Resources

The Disability Services and Resources Office handles all referrals regarding any student with a disability, whether temporary or permanent. The director provides guidance, assistance, and information for students with disabilities and assists the university's ADA coordinator with oversight of the university's compliance with Section 504 of the HEW Rehabilitation Act of 1973, the Americans with Disabilities Act, and other governmental regulations.

Referrals and inquiries concerning any matters relating to students with disabilities, accessible facilities, and/or reasonable accommodations should be directed to this office. In order to receive accommodations for a disability, students must initiate a request for services. It is the responsibility of the student to make his/her needs known by self-identifying as a student with a disability. To do so, students should contact the Director of the Disability Services and Resources Office and submit the required documentation of the disability upon acceptance to the university. These records are considered confidential and are maintained in the office, separate from other school records. *It is not a requirement that documentation be submitted with your application for admission.*

The Disability Services and Resources Office is located on the ground level of Sheffield Hall, in the rear of the building, and the Director can be reached by voice/TDD at (203) 932-7331. The Vice President for Facilities has been designated as the university's 504/ADA coordinator and can be reached at (203) 932-7199.

## Evening Services

Evening Services is a "one-stop" office specifically designated for evening graduate and undergraduate students. The purpose of this department is to establish and maintain communication with and provide services to evening students by combining the functions of the Admissions, Financial Aid, Records, and Bursar's offices to ensure a user-friendly environment for the evening student population.

The Evening Services staff is available to meet student needs and answer questions regarding all UNH activities. We can provide complete advising services to all undergraduate accelerated students and limited advising to all other evening students. This would include help with prerequisites, connecting the students with their advisors, and interpreting the college catalog. In addition, our office has computers, printers, and a copy machine available for student use.

The Evening Services Office is located in Kaplan Hall, room 210. Hours of operation are Monday through Thursday from 10:00 AM until 7:00 PM, and Fridays, 8:30 AM until 4:30 PM. You can reach staff members by phone: (203) 932-7180, fax: (203) 931-6063, or email: eveningservices@newhaven.edu.

## Food Services

University Dining Services consist of the Marketplace Food Court, Jazzman's Café, Pandini's, Sky Ranch Grill, Sandella's, the Quad Convenience Store, and University Catering. The Marketplace, Jazzman's, and University Catering are located in Bartels Hall. A second Jazzman's location can be found on the first floor of Peterson Library. Pandini's and Sky Ranch Grill are located in New Hall. Sandella's and the Quad C-Store are located on the first floor of Botwinik Hall.

**Marketplace Food Court** offerings include:

- Hometown (hot buffet)
- Top Hits (sautés and stir fries made to order)
- Deli favorites
- Mediterranean (vegan, vegetarian, and pasta)
- Pizza and calzones
- The Grill
- Baked goods and desserts
- Salad bar, soups, and beverages

**Jazzman's Café** offers:

- Gourmet coffee, cappuccino, and espresso
- Fresh-baked muffins, scones, etc.
- Sandwiches, salads, and snacks
- Fruit smoothies and cold beverages

**Pandini's** offers:

- Freshly made pizzas
- Baked and sautéed pastas
- Strombolis and calzones
- Italian sandwiches
- Entrée salads
- Desserts and beverages

**Sandella's** offers:

- Wraps and sandwiches
- Paninis
- Quesadillas
- Pizza

**Sky Ranch Grill** offers:

- 1/3 pound freshly grilled burgers
- Grilled and fried chicken
- Local favorites
- Side dishes and salads

**The Quad Convenience Store** is open 7 days a week and offers a wide selection of groceries, snacks, beverages, sundries, and health and beauty products. Please call or visit us. We welcome your comments and suggestions. Our office is conveniently located on the lower level of the Campus Center.

## Graduate Housing

On-campus housing for graduate students is not currently available. However, the Office of Residential Life maintains a listing of off-campus housing accommodations that includes apartments, houses, and private rooms. The university does not screen these listings and takes no responsibility for the condition of the room or apartment or for the rents asked, but the listings are an excellent source to assist graduate students in locating housing.

## Health Services

The university's Health Services Center, on the lower level of Sheffield Hall on the main campus, is open to all students without charge. The center is staffed by registered nurses and a part-time physician. A weekly women's clinic is staffed by nurse practitioners. Health Services provides initial care for minor illnesses and injuries as well as diagnosis, referral, and follow-up care for more serious conditions. The center is also a resource for information about medical questions and about other medical facilities in the community.

All full-time students entering the university must comply with state laws regarding immunizations for measles and rubella. Applicants to the Graduate School must complete the Immunization Form and return it to the UNH Health Services Office. In addition, students enrolling at UNH for full-time study must also file a completed Health Examination Report with the Health Services Office. Medical forms and information can be obtained by contact-

ing the Health Services Office at (203) 932-7079 or 1-800-DIAL-UNH, ext. 7079.

Connecticut State law requires that each student who resides in university-owned housing be vaccinated against meningitis as a condition of such residence.

In case of noncompliance, it is the policy of the university to withhold registration at the beginning of each term.

## International Student Services

The presence of international students at UNH helps make the university truly a global village. Our campus community is rich in cultures, ethnicities, languages, nationalities, politics, religions, and traditions. To encourage multicultural awareness through interaction with international students, the International Services Office (ISO) provides assistance to the university's diverse international student population, which is composed of undergraduate and graduate students from more than fifty countries. The staff assists students with immigration matters, provides liaison with sponsoring agencies and foreign governments, coordinates campus and community services, and promotes interaction among the international population, the university, and the communities of greater New Haven. The ISO provides information on travel to and from the United States and advises students on academic, social, and cultural adjustment. The ISO also coordinates and organizes various campus programs and activities, including International Coffee Hours, cultural celebrations such as Chinese New Year, an annual International Festival, and Graduate Orientation sessions for international students.

## Office of University Advancement

The Office of University Advancement is the fundraising arm of the university and includes Alumni Relations, the Annual Fund, Development, and Public Affairs. University Advancement works with the university community to develop philanthropic support for enhancement of the university's programs, facilities, and endowment. Gifts to the university enhance student financial aid, faculty development, equipment, library resources, and other institutional opportunities for growth. The generosity of corporations, foundations, parents, students, alumni, and friends contributes to the excellence of the University of New Haven.

The Alumni Relations staff invites you to remain connected to the university and offers a variety of activities and benefits sponsored by the Alumni Association. Educational, athletic, and social events are scheduled throughout the year, including the annual Scholarship Ball, Alumni Weekend, and networking socials. Alumni can take advantage of benefits such as reduced cost for graduate study, career development, and discounts on home and auto insurance. More information is available through UNH Online, an online directory and interactive community, at www.newhaven.edu/alumni. A board of directors oversees the Alumni Association. Send comments and suggestions to alumni@newhaven.edu.

The Annual Fund staff oversees the university's Hill Fund, which, through a student phonathon, solicits support from alumni and parents to fund special campus projects such as the David A. Beckerman Recreation Center.

The Public Affairs staff disseminates university news to alumni and friends through the alumni e-newsletter, *UNH Today for Alumni*; e-newsletters that represent four of the university's colleges; and the *University of New Haven* magazine. Public Affairs communicates news on campus through the university's e-newsletter, *UNH Today*, and to the general public through the news media. The staff also coordinates university special events.

## Office of Intercultural Relations

The Office of Intercultural Relations assists the university in promoting cultural diversity, awareness, and sensitivity throughout the campus community. The office provides leadership in promoting an environment responsive to the diversity of groups represented at UNH. Its programs, services, and activities promote cultural identity within a multicultural environment and encourage and support cooperative and collaborative relationships within the university community and with the university's external stakeholders.

This office seeks to advance the mission of the University of New Haven by providing students opportunities to gain intercultural understanding and to succeed in an inclusive academic and social environment that respects the uniqueness and contributions of all community members.

The office's initiatives include the following: the presentation of programs and workshops in the residence halls and classrooms; the development of a Diversity Resource Center (with books, magazines, music, crafts, etc. from different cultures) to serve as an educational resource for members of the campus community; the posting of information about scholarship, internship, and job opportunities pertinent to underrepresented populations of students; and the development of a diversity peer education program in collaboration with the Office of Residential Life. For more information, please call (203) 932-7427.

## Campus Card Office/ Parking Permits

The UNH Campus Card offers many services and advantages for all members of the UNH campus community. The Campus Card is a credit-card-sized, color-photo identification card. It is to be used as the official UNH library card and residential meal plan card, for security access identification, and for a number of other services.

All new students are required to obtain a Campus Card in order to register for a parking permit. The Campus Card must be renewed by all returning students at the beginning of the fall term every year. Campus Card photos are taken at Echlin Hall on the main campus. Campus Card Office hours are posted at the beginning of each term.

Resident freshmen are not permitted to have vehicles on campus or parked on city streets in the neighborhoods adjacent to campus.

In the interest of maintaining good relations with our neighbors, it is important that resident students limit parking to the designated ON CAMPUS parking areas. Resident student parking on city streets in the neighborhoods adjacent to campus is prohibited by the university. Vehicles in violation are subject to university sanctions including, but not limited to, UNH parking tickets.

The University of New Haven is not responsible for damage to, or theft from, personal vehicles parked on university property. New students may obtain a main campus parking sticker for their cars or motorcycles at the Campus Card Office or at the University Police Office in the lower level of the Campus Bookstore. All cars must display a UNH parking sticker; vehicles parked in violation may be ticketed or towed. Detailed information on parking regulations, violations, and reporting of accidents is contained in the Student Handbook.

## University Police Office

The staff of the University Police Office, located in the lower level of the Campus Bookstore, are certified police officers who undergo continuous training and who have been trained in emergency medical procedures, first aid, and CPR. They conduct regularly scheduled campus patrols and work closely with local, state, and federal agencies to enforce the laws of the State of Connecticut, especially those most pertinent to campus safety and security. The University Police Office is fully staffed 24 hours a day.

## Veterans' Affairs

Certification of veterans' educational benefits is a service provided by the Registrar's Office, which serves as a liaison between UNH student veterans and the Department of Veterans Affairs (DVA). The office provides forms for DVA benefits, advises student on procedural requirements, and certifies enrollment. Both the DVA and the Registrar's Office closely monitor each student's status and academic program.

For information on eligibility and payment or on how to apply for benefits or to transfer your existing benefits to UNH, contact:

Department of Veterans Affairs
Regional Office
P.O. Box 4616
Buffalo, N.Y. 14240-4616
1-888-GI-BILL-1 (1-888-442-4551)
http://www.va.gov/Education/

The certification official's office is in the Graduate Records Department in South Campus Hall. If you have questions or concerns, contact the VA Certifying Official during office hours, Monday through Friday, 8:30 AM to 4:30 PM, at:

(203) 932-7304
Fax (203) 932-7429

# Student Organizations

## Alpha Phi Sigma–Alpha Tau Chapter

Alpha Tau is the local chapter of Alpha Phi Sigma, the National Criminal Justice Honor Society. Alpha Tau's purpose is to recognize and promote academic excellence among undergraduate and graduate students. The local chapter was formed in 1998 and embraces the full spectrum of criminal justice students, from criminal justice and forensic science to pre-law and the related social sciences.

Graduate students who have a 3.5 cumulative QPR and who have completed at least 12 credit hours of graduate work, or 9 credit hours of graduate work and at least 3 additional undergraduate credit hours, are eligible for membership.

Additional information may be obtained by contacting the Alpha Tau advisor, Dr. James Monahan, in the Department of Criminal Justice.

## Criminal Justice Club

The American Criminal Justice Association (ACJA) is a national professional and preprofessional organization with goals that include improved technology, training, and service for the benefit of the criminal justice system. The UNH local student chapter of ACJA is the Psi Omega chapter. This club offers students a variety of activities, including community service as well as the opportunity to meet and work with practitioners in the field. Students also meet others with similar interest and are eligible to participate in regional and national programs and activities.

## Graduate Sport Management Club

The Management of Sports Industries program features a student club called the Graduate Sport Management Club. It serves as a networking group for current and former students. To help further their careers, members visit sports facilities, hold conferences, and meet with industry leaders. Members also often interact with the undergraduate Sport Industries Club.

## Graduate Student Council

Founded in 1976, the Graduate Student Council has expanded through diverse programming and as a result of increased enrollment of graduate students. The council is a student organization funded by the fee paid by all graduate students each trimester. Thus, all graduate students enrolled at UNH are automatically members and share in the activities of the council.

The purposes of the council are to promote the welfare of all Graduate School students, to give them counsel and support to encourage their active participation in the determination of their academic environment, to develop their school spirit through social and other activities, and to convey student opinion to the university administration.

The council serves as a cultural, social, and educational organization through a variety of activities, including biannual receptions for graduating students, an annual class gift to the university, and other supportive services.

## Lambda Pi Eta

The Beta Kappa Chapter of Lambda Pi Eta is the university's affiliate of the national honor society in communication. Founded in 1985, the chapter became an affiliate of the National Communication Association in 1994. The name represents what Aristotle described in his *Rhetoric* as the three modes of persuasion: *logos*, meaning logic; *pathos*, relating to emotion; and *ethos*, defined as character credibility and ethics. Lambda Pi Eta's purposes are to recognize, foster, and reward outstanding scholastic achievement; stimulate interest in the field of communica-

tion; and provide opportunities for dialogue among faculty and students interested in communication.

## NAGPS Affiliation

The Graduate School is an affiliate of the National Association of Graduate Professional Students (NAGPS), a nonprofit organization dedicated to improving the quality of graduate and professional student life in the United States. NAGPS works to promote the interests and welfare of graduate students and graduate education at local, regional, and national levels.

The NAGPS website (www.nagps.org) has information about current lobbying efforts in the U.S. Congress on issues affecting financial aid, student loans, and taxation of tuition benefits, etc. NAGPS also operates a Job Bank in a special section of the website. Graduate students enrolled at UNH are eligible for access to the Job Bank, as well as to the Fellowship/Scholarship and Grants databank, and can find additional benefits such as discounts on books and insurance and other information.

## Psi Chi

The Department of Psychology supports a chapter of Psi Chi, the National Honor Society in Psychology. Founded on the UNH campus in 1976, the chapter is one of more than 700. The honorary society was founded at the Ninth International Congress of Psychology at Yale University in 1929. Psychology program students are elected to Psi Chi to honor their achievement in their chosen field.

## Sigma Beta Delta

Sigma Beta Delta is a national honor society in business, management, and administration. The UNH College of Business chapter was inaugurated in May of 1994. UNH faculty are inducted as members, and graduate and undergraduate students are honored with initiation.

## Student Publications

Student publications include *The Charger Bulletin*, the university student newspaper, and *The Chariot*, the annual yearbook. Published under the auspices of the English Department, *The Elm City Review* is a student literary publication that provides an audience for creative writing selected from students' submissions of prose fiction and nonfiction as well as poetry. Students may volunteer to work on these student publications.

## WNHU Radio

WNHU, the university's student-operated radio station and FM stereo broadcast facility, is operated by the Communication Department of the College of Business throughout the year on a frequency of 88.7 MHz at a power of 1,700 watts. The station has a 30-mile radius on the FM band, serving Southern Connecticut and eastern Long Island, and is also broadcast live online at www.wnhu.net. This extracurricular enterprise, open to all undergraduate and graduate students, provides listeners with news, sports, weather, and music. The WNHU broadcast day features a variety of musical genres and styles played from 6 AM to 2 AM, seven days a week, every day of the year.

Most WNHU activities in programming, business, and engineering operations are performed by students in the university's day, evening, and graduate divisions. The station personnel will train all qualified students in their respective areas of interest; no prior radio experience is necessary.

# ACADEMIC PROGRAMS

## College of Arts and Sciences

### Graduate Degree Programs

Cellular and Molecular Biology, MS
Community Psychology, MA
Education, MS
    Teacher Certification
    Professional Education
Environmental Science, MS
Human Nutrition, MS
Industrial/Organizational
    Psychology, MA

### Graduate Certificates

Applications of Psychology
Bioinformatics
Forensic Psychology
Geographical Information Systems
International Relations
Legal Studies
Psychology of Conflict Management

## College of Business

### Graduate Business Degree Programs

Business Administration, MBA
Emerging Leaders, MBA
Executive, MBA
Management of Sports Industries, MS
Taxation, MS

### Other Graduate Degree Programs

Public Administration, MPA
  MBA/MPA, dual degree
Health Care Administration, MS
Labor Relations, MS

### Graduate Certificates

Accounting
Business Management
Finance
Health Care Management
Human Resources Management
International Business
Long-Term Health Care
Management of Sports Industries
Marketing
Public Administration
Public Management
Taxation
Telecommunication Management

## Tagliatela College of Engineering

### Graduate Degree Programs

Computer Science, MS
Electrical Engineering, MS
Environmental Engineering, MS
Executive Engineering Management, MS
Industrial Engineering, MSIE
  MBA/MSIE, dual degree
Mechanical Engineering, MSME

### Graduate Certificates

Civil Engineering Design
Computer Applications
Computer Programming
Computing
Lean-Six Sigma
Logistics
Network Administration
Quality Engineering

## Henry C. Lee College of Criminal Justice and Forensic Sciences

### Graduate Degree Programs

Criminal Justice, MS
Fire Science, MS
Forensic Science, MS
National Security and Public Safety, MS

### Graduate Certificates

Fire/Arson Investigation
Fire Science Technology
Forensic Computer Investigation
Forensic Psychology
Forensic Science/Advanced Investigation
Forensic Science/Criminalistics
Forensic Science/Fire Science
Information Protection and Security
National Security
National Security Administration
National Security Technology
Public Safety Management
Victim Advocacy and Services Management

# COLLEGE OF ARTS AND SCIENCES

**Ronald H. Nowaczyk, PhD, Dean**
**Robert D. Greenberg, PhD, Associate Dean**

Graduate programs in the College of Arts and Sciences offer opportunities for career preparation through the conscientious application of core liberal arts and sciences disciplines. Faculty with practical experience and engaging learning approaches work closely with students to cultivate their professional identities, skills, and awareness of global trends and challenges in their chosen fields. Graduate courses are offered through all of the Arts and Sciences departments.

The College of Arts and Sciences, through the Graduate School, offers master's degree programs in six fields: master of science degrees in cellular and molecular biology, education, environmental science, and human nutrition; master of arts degrees in community psychology and industrial organizational psychology.

Within the field of education, students may select either a teacher certification program, which has an optional full-time internship experience, or an advanced professional education program for those who already hold certification. The human nutrition program is offered part-time, one weekend per month, at the main campus in West Haven. The environmental science program provides many opportunities for field and laboratory experience along with classroom instruction. Students in cellular and molecular biology are training for specialized careers in the fields of bioinformatics, basic science, and pharmacological research.

Graduate certificates provide short, specific coursework in several fields, including Geographical Information Systems (GIS) and the psychology of conflict management.

At the undergraduate level, the College of Arts and Sciences offers associate and bachelor's degree programs in a wide variety of fields, from art and graphic design to dental hygiene, music and sound recording to psychology, and a liberal studies degree. A combined five-year BS/MS program in environmental science is offered for students who meet certain qualifications. UNH undergraduates who want to pursue a teaching career also may be eligible for early admission to the UNH Education Department through the Accelerated Entry Process, which allows qualified undergraduates to begin their education coursework as undergraduates and enables them to earn a bachelor's degree, master's degree, and Connecticut certification in five years. The College of Arts and Sciences sponsors a variety of cultural, educational, and artistic endeavors at the university, including faculty forums, performances by artists, and guest speakers.

## Cellular and Molecular Biology

Coordinator: Eva Sapi, Associate Professor, PhD, Eotvos Lorand University, Budapest, Hungary

The master of science program in cellular and molecular biology is intended for those interested in the rapidly expanding fields of biotechnology, basic science, and pharmacological research. The level of experience required for an individual to contribute in these fields is not satisfied by an undergraduate degree; therefore, individuals with advanced training are in demand.

The program, with strong emphasis on biochemistry and molecular biology techniques, will provide students with the preparation needed for advanced training. The central curriculum consists of courses in biochemistry, cell biology, genomics, and molecular biology. These courses will develop the student's ability to function as an independent scientist by stressing both conceptual and technical aspects of each subject.

### Admission Policy

Applications for the cellular and molecular biology program may be submitted at any time; however, full-time admission to the program will be granted for the Fall trimester only.

Candidates for admission to the cellular and molecular biology program are expected to have a bachelor's degree in biology, chemistry, or a related discipline. The undergraduate coursework should have included general biology, advanced biology electives, general chemistry, and organic chemistry. It is also recommended that applicants have taken introductory statistics, calculus, molecular biology, and biochemistry.

Students who do not hold a bachelor's degree in an appropriate field or who lack the minimum program prerequisites may be provisionally accepted and then must complete the requirements stipulated at the beginning of the program study. Upon completion of the provisional requirements, the student's record will be evaluated for full admission. In addition, provisionally accepted students may be prevented from enrolling in certain specific graduate courses until prerequisites are met, as determined by the program coordinator.

## MS, Cellular and Molecular Biology

A minimum of 38 credit hours of graduate work must be completed to earn the Master of Science degree in Cellular and Molecular Biology. The program consists of eight required and at least four elective courses.

Students are required to participate in research. The requirement may be satisfied by completion of a research project or an internship or a thesis. Research project and internship options are intended for students who are interested in learning about academic or industrial research environments or who are already employed. The thesis option is intended for students interested in future pursuit of a doctoral degree.

Cooperative education experience may also be used for research credit, with the approval of the program coordinator.

Students who elect to write a thesis, as a part of the program of study, must take MB 698 and 699, Thesis I and II (6 credits). For those students a minimum of 41 credit hours of graduate work must be completed to earn the Master of Science degree in cellular and molecular biology. Thesis preparation and submission must comply with the Graduate School policy on theses as well as all specific departmental requirements.

**Required Courses**

| | | |
|---|---|---|
| BI | 605 | Biostatistics |
| MB | 601 | Protein Biochemistry and Enzymology |
| MB | 603 | Nucleic Acid Biochemistry |
| MB | 606 | Molecular Genetics/Genomics |
| MB | 607 | Cellular Biology |

*Plus one of the following courses:*

| | | |
|---|---|---|
| E | 659 | Writing and Speaking for Professionals |
| MB | 608 | Evaluation of Scientific Literature |

*Plus two of the following courses:*

| | | |
|---|---|---|
| MB | 611 | Molecular Biology of Proteins with Laboratory (4 credits) |
| MB | 613 | Molecular Biology of Nucleic Acids with Laboratory (4 credits) |
| MB | 617 | Cell Culture Techniques with Laboratory (4 credits) |

**Research options**

| | | |
|---|---|---|
| MB | 690 | Research Project |
| MB | 688/689 | Internship I and II |
| MB | 698/699 | Thesis I and II |

**Electives**

| | | |
|---|---|---|
| MB | 602 | Biochemistry of Bioenergetics |
| MB | 620 | Bioinformatics |

| | |
|---|---|
| MB 625 | Advanced Bioinformatics |
| MB 636 | Immunology |
| MB 644 | Cellular Development |
| MB 648 | Cytoskeleton and Extracellular Matrix |
| MB 650 | Oncogenes and Cytokines |
| MB 656 | Receptor Effector Systems |
| MB 670 | Special Topics |
| MB 680 | Graduate Seminar |
| MB 695/696 | Independent Study I and II |

Total Credits: 38-41

# Community Psychology

**Coordinator:** Michael A. Morris, Professor, PhD, Boston College

The field of community psychology applies theories and techniques from psychology and related social sciences to the task of understanding and modifying the complex social forces that influence individual and community well-being.

Accordingly, the MA program in community psychology provides training in current approaches to preventing and treating psychological problems, emphasizing interventions at the level of social institutions, organizations, and groups as well as the individual. Community analysis, consultation, and crisis intervention are addressed, in addition to program development, administration, and evaluation.

Classroom study is closely integrated with supervised internships in a variety of human service organizations and community settings.

Graduates assume positions of responsibility in a broad range of human service settings, such as mental health programs, youth service bureaus, community centers, child development programs, municipal services, state agencies, health care systems, and community action programs.

## Admission Policy

An undergraduate degree from an accredited institution is required. A major in psychology is preferred but not required. However, all students are expected to have at least an introductory-level understanding of psychological concepts, principles, and methods before entering. Students who have not had an undergraduate course in statistical methods may be required to take one before enrolling in P 608. Academic performance and relevant work/volunteer experience play a major role in admission decisions.

Applicants should submit a personal statement describing their interest in community psychology in addition to providing the materials required by the Graduate School. Applicants may also be required to submit scores from either the Miller Analogies Test or the Graduate Record Examination Aptitude Test, at the discretion of the department. Students who intend to pursue further graduate work are strongly encouraged to take the GRE early in their first year of study in the program.

## Internships and Seminars

Supervised internships in a variety of settings are a major vehicle through which students in the program develop applied skills. Students plan their internship activities in collaboration with both the program's coordinator and their supervisor from the field setting. Internships are provided in the areas of individual intervention, consultation, and systems intervention. Students with a year or more of appropriate full-time human service experience in a particular internship area can substitute an elective course for that internship, contingent upon the approval of the program coordinator.

Internship seminars provide a theoretical and research framework within which the development of applied skills is examined and discussed. The seminars enable students to conceptualize within a broader context the issues encountered in the field. In addition, a comprehensive project report in which students analyze and integrate their internship with relevant research and coursework is required.

## Thesis

Students may choose to write a thesis as part of their program of study. The thesis must demonstrate an ability to organize and present data and conclu-

sions in a clear, original, and well-reasoned fashion. A thesis is strongly recommended for students wishing to pursue doctoral training after graduation. Thesis preparation and submission must comply with Graduate School policy as well as all specific departmental requirements.

## MA, Community Psychology

The program consists of 45 credit hours, 24 of which comprise the core curriculum completed by all students and 12 of which constitute one of three areas of concentration.

Required Courses

| | | |
|---|---|---|
| P | 605 | Survey of Community Psychology |
| P | 608 | Psychometrics and Statistics |
| P | 609 | Research Methods |
| P | 610 | Program Evaluation |
| P | 612 | Consultation Seminar |
| P | 615 | Consultation Fieldwork |
| P | 611 | Individual Intervention Seminar |
| | | *or* |
| P | 613 | Systems Intervention Seminar |
| P | 614 | Individual Intervention Fieldwork |
| | | *or* |
| P | 616 | Systems Intervention Fieldwork |

Concentration (four courses)
Electives (three courses)

**Total credits: 45**

## Concentration in Community-Clinical Services

The Community-Clinical Services concentration prepares students for careers in clinical, mental health, and related human service settings. Direct work with individuals is stressed, as are consultation, social problem analysis, and prevention techniques and strategies.

| | | |
|---|---|---|
| P | 625 | Life Span Developmental Psychology |
| P | 628 | The Interview |
| P | 629 | Introduction to Psychotherapy and Counseling |
| P | 632 | Group Treatment and Family Therapy |
| P | 636 | Abnormal Psychology |

**Total credits: 12 (Select 4 of 5)**

## Concentration in Forensic Psychology

The Forensic Psychology concentration, offered jointly by the Psychology and Criminal Justice Departments, prepares students for careers in the management and care of offenders in forensic settings. In addition, it is designed to enhance the knowledge and skills of professionals currently working in law enforcement, the courts, and various community-based treatment and prevention programs.

| | | |
|---|---|---|
| CJ | 623 | Mental Health Law |
| P | 656 | Abnormal Psychology in Forensic Populations |
| P | 657 | Forensic Assessment and Outcome Evaluation |
| P | 658 | Forensic Treatment Models |

**Total credits: 12**

## Concentration in Program Development

The Program Development concentration prepares students for careers that emphasize the administration of both traditional and non-traditional programs and services. The concentration addresses planning, development, and evaluation of innovative approaches to treatment and prevention in the public and private human service sectors as well as in business and industry.

| | | |
|---|---|---|
| P | 619 | Organizational Behavior |
| P | 628 | The Interview |
| PA | 604 | Communities and Social Change |
| PA | 602 | Public Policy Formulation and Implementation |
| | | *or* |
| PA | 649 | History and Development of Health Care Institutions |

**Total credits: 12**

# Education Programs

The Education Department offers two programs of graduate study: (1) Teacher Certification for those seeking initial certification in the areas of elementary and secondary education in social studies, language arts (English), mathematics, science (biology, chemistry, physics, earth science, or general science), and business; (2) Professional Education for currently certified teachers seeking professional advancement. Both programs lead to the Master of Science in Education degree. Many courses are offered at three locations: West Haven, Newington, and Mitchell College (Southeastern) in New London. These programs represent the university's commitment to the preparation of future educators for meaningful roles in teaching the youth of the 21st century.

The Bachelor's Plus Program for UNH undergraduates interested in a teaching career enables candidates to begin their teacher preparation program as undergraduates. Students can earn a bachelor's degree, master's degree, and Connecticut teaching certification in five years. Contact the Education Department for information.

## Education: Teacher Certification

**Chair:** Paulette Pepin, Assistant Professor, PhD, Fordham University

**Chief Certification Officer:** Phyllis S. Gwatkin, MS, Fordham University; CAGS, St. Joseph College

**Director of Student Teaching:** Suzanne Murphy, MA, Yale University; MS and CAGS, Southern Connecticut State University

**Internship and Recruitment Coordinator:** Nicholas Maiorino, MA, Sixth Year Certificate, Southern Connecticut State University

**Capstone and Mathematics Coordinator:** John Ciochine, BS, Southern Connecticut State University, MS & Sixth Year, Fairfield University

The Teacher Certification program prepares educators to teach today's diverse student populariion. Candidates are required to enter the program with a strong academic major from their undergraduate institution. The Teacher Certification Program builds on this previous content knowledge while blending educational theory and practice within the context of effective pedagogical practices. Particular emphasis is placed on linking field experiences to coursework. Because teacher candidates are expected to teach diverse student populations, students participate in both urban and suburban field experiences.

### Admission Policy

Candidates must hold a baccalaureate degree from an accredited institution of higher education, with an academic major. Candidates must have a broad range of general core academic courses as well as courses specific to the subject area and/or level of certification sought. In addition, all candidates must meet the requirement for one three-credit course in United States history, which may be credited from undergraduate coursework or fulfilled in the university's graduate program by taking an elective (HS 610 Survey of United States History). Official undergraduate transcripts must be submitted for review to determine whether or not candidates have successfully met background requirements.

A minimum grade point average of 2.7 (equivalent to a B-) is required for admission, and only grades of C or higher are accepted. In addition to coursework and grade requirements, all applicants must pass PRAXIS I or obtain an approved waiver from the state of Connecticut prior to admission. Candidates must submit two letters of recommendation and an essay describing experience relevant to teaching as well as reasons for applying to the program. All prospective candidates are interviewed. Information outlining admission criteria is available from the Education Department website www.newhaven.edu/education. Information sessions are held periodically; dates and times are posted on our website.

## MS, Education with Teacher Certification

A total of 36 credits is required for completion of the degree of Master of Science in Education. Typically, the degree can be completed in one year.

To obtain teaching certification, candidates must also take six credits of student teaching (ED 600), which is required for Connecticut certification. Candidates should note that these six credits are taken in addition to the 36 credits required for the MS degree and that student teaching credits do not count toward the MS degree. Successful completion of student teaching with a grade of B- or higher is required before candidates are recommended to the Connecticut State Department of Education for initial teacher certification.

All candidates begin the program by attending orientation sessions and ED 601 Introduction to Education, a required one-credit course designed to introduce candidates to the field of education. ED 601 is offered in August for those candidates beginning their studies in September and in December for those who begin in January. Candidates may begin the program in either the fall term or the winter term. Full-time candidates take their courses together as a cohort, fostering collegiality and professional relationships that frequently continue beyond the program's duration.

### Field Experiences

**Intern Candidates:** A supervised internship is an option available to all candidates. Candidates, while interning, are expected to work in a school district for their 3 trimesters. In return, the Connecticut school district and the university pay the student's tuition for the 36-credit Master of Science degree.

**Capstone (non-intern) Candidates:** Candidates who do not choose the internship option must complete 3 pre-student teaching field experiences while in their program. In the final field experience, candidates will be placed in a classroom under the guidance of a teacher and university supervisor for a minimum of two weeks. The final field experience provides opportunities for observing experienced teachers, implementing selected lesson plans, and reflecting on practice.

**Student Teaching:** Before the student teaching field experience, all candidates must complete all prerequisites and professional courses. Secondary candidates must pass Praxis II before applying for Student Teaching and must have a GPA of 3.0 or higher. Candidates participate in a 13-week student teaching practicum under the guidance of a Basic Education Support Team (BEST) trained classroom teacher. Candidates may also be required to attend student teaching seminars during this period.

## Elementary Certification (Grades K-6)

The following courses are required for candidates seeking elementary certification (Grades K-6):

**Required Courses**

**Core Courses (18 credits)**

| | |
|---|---|
| ED 601 | Introduction to Education (1 credit) |
| ED 603 | Human Growth and Development (3 credits) |
| ED 604 | Educational Psychology (3 credits) |
| ED 605 | Students with Special Needs (3 credits) |
| ED 606 | History of American Education (online) (2 credits) |
| ED 620 | Seminar in Multicultural Issues (1 credit) |
| ED 680 | Contemporary Issues (3 credits) |
| ED 682 | Measurement, Assessment, and Evaluation (2-3 credits) |

**Strategies Courses (14 credits)**

| | |
|---|---|
| ED 621E | Teaching Strategies in Mathematics (3 credits) |
| ED 622E | Teaching Strategies in Science (3 credits) |
| ED 626E | Strategies for Teaching Reading & Language Arts in Elementary Schools (3 credits) |
| ED 630E | Children's Literature (2 credits) |
| ED 636 | Early Literacy (3 credits) |

**Internship Field Experience**

| | |
|---|---|
| ED 692I | (1 credit) |
| ED 693I | (1 credit) |
| ED 694I | (2 credits) |
| | *or* |

**Capstone Field Experience**

| | |
|---|---|
| ED 692C | (1 credit) |

ED 693C (1 credit)
ED 694C Final Experience III (2 credits)

**Other requirements**

Candidates must pass a comprehensive examination on pedagogy as a degree requirement.

**Total credits: 36**

## Secondary Certification (Grades 7-12)

The following courses are required for candidates seeking secondary certification (grades 7-12):

**Required Courses**

**Core Courses (18 credits)**

ED 601 Introduction to Education (1 credit)
ED 603 Human Growth and Development (3 credits)
ED 604 Educational Psychology (3 credits)
ED 605 Students with Special Needs (3 credits)
ED 606 History of American Education (online) (2 credits)
ED 620 Seminar in Multicultural Issues (1 credit)
ED 680 Contemporary Issues (3 credits)
ED 682 Measurement, Assessment, and Evaluation (2-3 credits)

**Strategies Courses (8-9 credits)**

ED 627 Reading and Writing Across the Curriculum (3 credits), (for non-language-arts majors)
*or*
ED 630S Reading and Adolescent Literature (3 credits) (for English majors)
*and*
ED 642 Current Instructional Trends (2-3 credits)

*Plus one of the following (depending on subject area certification):*

ED 621S Teaching Strategies in Mathematics (3 credits)
ED 622S Teaching Strategies in Science (3 credits)
ED 623S Teaching Strategies in Social Studies (3 credits)
ED 624 Teaching Strategies in Business (3 credits)
ED 625S Teaching Strategies in Language Arts/Secondary School (3 credits)

**Internship Field Experience**

ED 692I (1 credit)
ED 693I (1 credit)
ED 694I (2 credits)
*or*

**Capstone Field Experience**

ED 692C (1 credit)
ED 693C (1 credit)
ED 694C Final Experience III (2 credits)

**Other requirements:**

Candidates must pass a comprehensive examination on pedagogy as a degree requirement.

*Plus:*
Electives (6 credits)

**Total credits: 36**

## Applying for State Certification

In the certification process, the university must recommend the candidate to the Connecticut State Department of Education. After candidates have successfully completed the professional courses in their program, including Student Teaching (ED 600), the Certification Officer verifies that candidates have met all requirements and then recommends, with department approval, candidates for certification. **The courses taken for a particular certification must be consistent with the statutory requirements of laws current at the time of application for certification rather than the laws operating at the time of admission to the university.**

### U.S. Department of Education Title II Report

Section 207 of Title II of the Higher Education Act mandates that the Education Department collect data on assessments, requirements, and standards for teacher certification and licensure as well as perform-

ance of teacher preparation programs. The law requires that these data be used to submit an annual report on the quality of teacher preparation to the U.S. Congress. The full report of annual data for the University of New Haven's performance is available from the Education Department.

## Professional Education

**Chair:** Paulette Pepin, Assistant Professor, PhD, Fordham University

The Professional Education Program, leading to a Master of Science in Education degree, provides a curriculum for continuing professional growth. Applicants must hold a baccalaureate degree from an accredited institution of higher education and teaching certification in Connecticut or elsewhere. This program does not lead to the university's recommendation for teacher certification, but candidates holding a current Connecticut teacher certification may wish to consider designing their professional Education Program to include courses that will enable them to apply directly to the Connecticut State Department of Education to add a cross-endorsement on their current teaching certificate.

Admission requirements include two letters of recommendation, official transcript(s), a valid certification license in Connecticut or elsewhere, an essay setting forth the candidare's reasons for enrolling in the program, and an interview with the Certification Officer or designee.

## MS, Professional Education

A total of 36 credits is required for completion of the Master of Science in Education degree. Teachers will be provided with the opportunity to take a wide variety of courses among the required and elective courses offered. Contact the Education Department for information.

**Required Courses**

**Core Courses (15-16 credits)**

| | |
|---|---|
| ED 604 | Education Psychology |
| ED 612 | Curriculum Design |
| ED 620 | Seminar in Multicultural Issues (1 credit) |
| ED 682 | Measurement, Assessment, and Evaluation |
| ED 683 | Computer Applications for Teachers |

*Plus:*

| | |
|---|---|
| ED 685 | Research in the Schools |

*or*

| | |
|---|---|
| ED 690 | Research Project |

*or*

| | |
|---|---|
| ED 694 | Field Experience III |

*Plus:*

Approved Electives (20-21 credits)

**Total credits:** 36

# Environmental Science

**Coordinator:** Roman N. Zajac, Professor, PhD, University of Connecticut

The purpose of this program is to provide graduate-level education for careers in environmental science as well as for other areas requiring knowledge of environmental principles. It is intended to meet the needs of those who wish to enter this dynamic and expanding field, those who are active environmental scientists and managers, and also those who plan to pursue graduate training beyond the master's level. An interdisciplinary program comprised of courses in ecology, geology, chemistry, and legislation, it provides the advanced skills and knowledge necessary to meet the increasing demand for scientists with an environmental background. Field and laboratory work provide practical experience for students enrolled in the program, while ongoing faculty projects provide opportunities to perform research on various environmental problems and issues.

Scientists knowledgeable in environmental issues and science are needed by employers in the following major areas:

- government agencies, particularly in the areas of environmental protection and management
- water, sewer, and power-generation utilities
- analytic laboratories
- environmental and engineering firms

- industries in the field of pollution control
- private industry and management
- non-governmental organizations such as the United Nations, the World Bank, and conservation groups
- educational institutions such as museums and science centers.

### Admission Policy

Candidates for admission to the environmental science program are expected to have a bachelor's degree in the sciences with courses in biology, general chemistry, organic chemistry, and calculus. Also suggested are a course in introductory statistics and a course in physics. Students who do not hold a bachelor's degree in science or who lack the minimum program prerequisite requirements will be required to complete them before enrolling in certain specific graduate courses, as will be determined in consultation with the program coordinator.

It is expected that all prerequisites will be completed either prior to enrolling in graduate courses or within a year of admission into the program. This period can be extended only with the consent of the program coordinator. Students who must take a course in organic chemistry as a program prerequisite may choose to take CH 600 Introduction to Environmental Chemistry to fulfill this requirement. It should be noted, however, that CH 600 is taken on an excess-credit basis and will not be counted towards fulfilling the program requirement of 42 graduate credits.

## MS, Environmental Science

A minimum of 42 credit hours must be completed to earn the Master of Science in Environmental Science degree. The transfer of credit earned at other institutions will be permitted subject to the Graduate School policy on transfer credit detailed elsewhere in this catalog.

The program consists of five required core courses plus an additional nine courses that may be taken in a specified area of concentration. Note that students who do not choose to concentrate in a particular area will be required to follow a plan of study determined in consultation with the program coordinator. Required courses cover common areas in environmental science, while the electives and concentration options enable students to study in a particular area of interest or subjects with direct application to their current professional situations.

Students may elect to write a thesis as part of the program of study. Thesis preparation and submission must comply with the Graduate School policy on theses as well as all specific departmental requirements. A thesis is recommended for students who wish to pursue doctoral training after graduation and for those with specific professional interests. For students who choose the thesis option, the selection of thesis courses will be determined in consultation with the program coordinator and the thesis advisor and will include EN 698 and 699 Thesis I and II in lieu of other courses in the program.

Students should note that a number of courses in this program require some weekend field trips, lab sessions, or acceptable alternatives. In addition, students should consult the program coordinator for advice on selection of appropriate courses and on assuring compliance with prerequisites.

**Required Courses**

| | | |
|---|---|---|
| CE | 606 | Environmental Law and Legislation |
| CH | 601 | Environmental Chemistry |
| EN | 600 | Environmental Geoscience |
| EN | 601 | Principles of Ecology with Laboratory (4 credits) |
| EN | 690 | Research Project* |

Concentration or Approved Electives

**Minimum total credits: 42**

**Students will select a topic in their area of concentration for completion of EN 690 Research Project.*

Note: Students who select the general program rather than a concentration in a specific area will be required to follow a plan of study determined in consultation with the program coordinator.

## Concentrations

Students may elect to pursue one of the following four specific concentrations for the elective portion

of the program. As students declare a concentration, they will be assigned to the faculty advisor responsible for it, and the advisor will help the student formulate an individual program and the required approved electives, which must be selected from at least two other concentration areas.

## Concentration in Environmental Ecology

**Concentration Advisor:** Roman N. Zajac, Professor, PhD, University of Connecticut

| | |
|---|---|
| EN 602 | Environmental Effects of Pollutants |
| EN 607 | Environmental Reports and Impact Assessment |
| EN 609 | Data Analysis in the Environmental and Biological Sciences |
| EN 615 | Toxicology |

Restricted Electives (two courses, from two other concentrations)

*Plus two to three of the following:***

| | |
|---|---|
| EN 603 | Wetlands Ecology with Laboratory (4 credits) |
| EN 604 | Ecology of Inland Waters |
| EN 605 | Marine and Estuarine Ecology (4 credits) |
| EN 608 | Landscape Ecology |
| EN 621 | Hydrology (4 credits) |
| EN 650 | Environmental Microbiology (4 credits) |
| EN 670 | Selected Topics |

**Minimum total credits:** 26

** *The choice of electives is made in consultation with the program coordinator in light of the student's academic and professional goals.*

## Concentration in Environmental Geoscience

**Concentration Advisor:** R. Laurence Davis, Professor, PhD, University of Rochester

| | |
|---|---|
| EN 621 | Hydrology (4 credirs) |
| EN 622 | Groundwarer Geology (4 credits) |
| EN 632 | Field Geology of the Northeast (4 credits) |

*or*

| | |
|---|---|
| EN 633 | Selected Topics in Field Geology (1-4 credits) |

Restricted Electives (two courses, from two other concentrations)

*Plus two to four of the following:***

| | |
|---|---|
| EN 617 | Subsurface Assessment |
| EN 620 | Advanced Environmental Geology (4 credits) |
| EN 625 | Geomorphology (4 credits) |
| EN 626 | Glacial Geology |
| EN 627 | Soil Science |
| EN 670 | Selected Topics |

**Minimum total credits:** 26

** *The choice of electives is made in consultation with the program coordinator in light of the student's academic and professional goals.*

## Concentration in Environmental Health and Management

**Concentration Advisor:** Roman N. Zajac, Professor, PhD, University of Connecticut

| | |
|---|---|
| EN 607 | Environmental Reports and Impact Assessment |
| EN 615 | Toxicology |
| EN 617 | Subsurface Assessment |
| EN 618 | Hazardous Materials Management |

Restricted Electives (two courses, from two other concentrations)

*Plus two to three of the following:***

| | |
|---|---|
| CE 605 | Solid Waste Management |
| EN 602 | Environmental Effects of Pollutants |
| EN 610 | Environmental Health |
| EN 612 | Epidemiology |
| EN 613 | Radioactivity and Radiation in the Environment |
| EN 616 | Human Health and Environmental Risk Assessment |
| EN 670 | Selected Topics |
| SH 608 | Industrial Hygiene Practices |
| SH 620 | Occupational Safety and Health Law |

**Minimum total credits:** 26

** *The choice of electives is made in consultation with the program coordinator in light of the student's academic and professional goals.*

## Concentration in Geographical Information Systems and Applications

**Concentration Advisor:** Daniel DePodesta, Practitioner-in-Residence, MBA, Quinnipiac University

| | |
|---|---|
| EN 640 | Introduction to Geographical Information Systems |
| EN 641 | Geographical Information System Techniques and Applications I |
| EN 642 | Geographical Information System Techniques and Applications II |
| EN 643 | Advanced Applications of GIS |

Restricted Electives (two courses, from two other concentrations)

*Plus two to three of the following:***

| | |
|---|---|
| EN 608 | Landscape Ecology |
| EN 620 | Advanced Environmental Geology (4 credits) |
| EN 625 | Geomorphology (4 credits) |
| EN 670 | Selected Topics |

**Minimum total credits: 26**

***The choice of electives is made in consultation with the program coordinator in light of the student's academic and professional goals.*

See the Table of Contents for the certificate in geographical information systems.

# Human Nutrition

**Coordinator:** Rosa A. Mo, Instructor, EdD, RD, Columbia University

The purpose of the program leading to the Master of Science in Human Nutrition degree is to provide high-quality nutrition education at the graduate level for working adult students in the food, pharmaceutical, and allied health fields so that they may apply up-to-date and in-depth nutritional knowledge in their areas of specialization and gain a foundation for further study at the PhD level. This biomedically oriented program has a solid scientific foundation with a strong focus on the role of nutrition in health and disease. Therefore, the curriculum is designed to give graduates a deep understanding of the close connections among nutrition, health, and disease as well as to provide them with a detailed study of the body of knowledge necessary to understand these connections and the evidence supporting them.

For the convenience of students whose work schedules and other obligations preclude attendance at evening classes, this program is offered on a weekend schedule. Classes meet monthly on the main campus both Saturdays and Sundays from 9 AM to 5 PM.

The Master of Science in Human Nutrition program is affiliated with the Yale-New Haven Hospital Dietetic Internship.

### Admission Policy

This program is most appropriate for registered dietitians and certain other licensed health professionals or for high school science teachers and/or others with undergraduate majors in chemistry or the biological sciences. Minimum admission requirements are a four-year baccalaureate degree from an accredited university or equivalent, with an above-average undergraduate record including successfully completed prerequisite coursework in introductory biochemistry or organic chemistry plus human anatomy and physiology.

## MS, Human Nutrition

Completion of a total of 33 graduate credit hours is required for the Master of Science in Human Nutrition degree.

**Required Courses**

| | |
|---|---|
| NU 601 | Nutritional Biochemistry I: Fundamentals |
| NU 602 | Nutritional Biochemistry II: Applications |
| | *or* |
| NU 606 | Cell and Molecular Biology of Human Nutrition |
| NU 603 | Nutritional Physiology |
| NU 604 | Vitamin Metabolism |
| NU 605 | Mineral Metabolism |
| NU 609 | Research Methodology in Nutrition |
| NU 610 | Nutrition and Disease I |

| | |
|---|---|
| NU 611 | Nutrition and Disease II |
| NU 612 | Nutrition and Health: Contemporary Issues and Controversies |
| NU 613 | Maternal and Child Nutrition |
| NU 690 | Research Project |

Total credits: 33

### Program Options—Human Nutrition

Students enrolled in the Human Nutrition graduate program may wish to complete undergraduate courses that would fulfill the foundation knowledge and skills required in a Didactic Program in Dietetics (DPD) approved by the Commission on Accreditation for Dietetics Education (CADE) of the American Dietetic Association, 120 South Riverside Plaza, Suite 2000, Chicago, IL 60606-6995, (800) 877-1600, www.eatright.org. The undergraduate Nutrition and Dietetics program encourages students to request a transcript evaluation from the program Director, Georgia Chavent, (203) 932-7410, to determine which undergraduate courses are required to receive a Verification Statement. A minimum of six undergraduate courses must be taken at UNH. Students holding a Verification Statement may apply to a Supervised Practice Program such as a Dietetic Internship. Following completion of the practice program or dietetic internship, the candidate may sit for the exam to become a registered dietitian (RD).

## Industrial/Organizational Psychology

Coordinator: Stuart D. Sidle, Assistant Professor, PhD, DePaul University

The study and practice of industrial and organizational psychology is directed toward enhancing the effectiveness and functioning of organizations by applying psychological principles to human work behavior.

The primary goal of the program leading to the Master of Arts in Industrial and Organizational Psychology degree is to provide students with the knowledge and experience necessary to improve the satisfaction and productivity of people at work.

Graduates typically perform activities in a number of areas that focus on individual, group, and organizational processes, including:

- Organizational change and development
- Consultation
- Motivation and morale
- Leadership and managerial development
- Conflict management
- Team/group dynamics
- Recruiting, selection, and placement
- Performance management
- Attitude and opinion measurement
- Training design and implementation
- Strategic human resource planning
- Employment law
- Job analysis and evaluation
- Job design and enrichment
- Employee assistance programs
- Compensation and benefits
- Program evaluation.

Building on a strong foundation of theory, the program emphasizes application of principles in a wide variety of work settings. The curriculum is strengthened by ongoing, active relationships with local and regional human resource and applied psychological associations. Another unique feature of the program is the Center for Dispute Resolution (CDR) which offers mediation services to UNH students, faculty, and staff as well as providing training in mediation and negotiation. Furthermore, the I/O Psychology program at UNH conforms to the standards of the Council of Applied Master's Programs in Psychology (CAMPP).

This master's degree prepares students for careers in private and public corporations, consulting firms, government agencies, and applied research institutions. Those aspiring to enter the field, practicing professionals, and those planning for graduate training beyond the master's level will find their educa-

tional needs accommodated by the flexible nature of the program.

### Admission Policy

Applicants are expected to possess social and interpersonal characteristics that will support success in organizational settings. Students who give evidence of a mature interest in the application of psychological principles to organizational problems and who hold an undergraduate degree from an accredited college or university are eligible for admission.

Students who haven taken the Graduate Record Examination (GRE) within the past five years are asked to report their scores to the Graduate School. In addition to the Graduate School application form, applicants will be asked to complete an I/O program questionnaire and submit it directly to the Graduate School. For applicants whose native language is not English, TOEFL scores must be reported to the Graduate School. ESL certification is also welcomed.

An undergraduate major in psychology is not specifically required as a basis for consideration. However, all students are expected to have at least an introductory-level understanding of psychological concepts, principles, and methods before taking courses in the master of arts in industrial/organizational psychology program.

## MA, Industrial/ Organizational Psychology

A total of 48 credit hours is required of candidates for the degree of Master of Arts in Industrial/ Organizational Psychology. Candidates for this degree must complete 24 credit hours of required courses in the core curriculum. Another 24 credit hours (including concentrations, program options, and electives) are chosen after consultation with the program coordinator in light of the student's academic and professional goals. Students may not complete more than nine credit hours of electives until they have satisfied the core requirements. Up to nine credit hours of electives may be taken in other departments, such as industrial engineering, economics, management, marketing, and public administration.

### Transfer Credit

The transfer of credit from other institutions will be permitted subject to the Graduate School policy on transfer of credit detailed elsewhere in this catalog.

### Thesis

Students may elect to write a thesis as part of the program of study. The thesis must show ability to organize materials in a clear and original manner and to present well-reasoned conclusions. Thesis preparation and submission must comply with the Graduate School policy on theses as well as all specific departmental requirements.

### Program Options

Students have the opportunity to develop a program that meets their particular needs and interests by choosing from many elective courses and various program options. These options include a thesis, for those interested in future pursuit of a doctoral degree; an internship, for those interested in a practical introduction to an organizational environment; or a practicum, for those already employed.

**Option 1 (Thesis)** is intended primarily for those who are interested in continuing their education in doctoral-level programs. This option gives students the research experience necessary to be successful in pursuit of admission to and completion of a PhD program.

**Option 2 (Internship/Practicum)** allows the student to acquire special skills by coordinating formal coursework with an internship or practicum in an organizational setting. The internship gives the student with limited work experience the opportunity to work in cooperating organizations or consulting firms. The practicum experience is for the student who is currently employed.

The content of the practicum or internship will be established jointly by the cooperating organiza-

tion, the program coordinator, and the student. A comprehensive project report is required in which the student will analyze and integrate internship/practicum experiences with relevant research and coursework.

**Option 3 (Approved Electives)** consists of elective courses selected under faculty advisement. The choice of electives is intended to provide the student with a broad interdisciplinary background, complementing the student's own academic training and interests. A comprehensive examination covering material from the required core psychology courses is required under this option.

## Program Concentrations

Within each of the program options described above, students may concentrate in (1) the industrial-human resources area, (2) the organizational area, or (3) the field of conflict management. A concentration requires 12 credit hours of specific elective courses, which are counted as part of the 24 credits required in the elective option (Thesis, Internship/Practicum, or Approved Electives) selected by the student for completion of the program. If a concentration is selected, the student must notify the program coordinator as well as the Registrar. A concentration is not required if the student's educational or career goals can best be met without this specialization.

**Required Courses (24 credits)**

| | | |
|---|---|---|
| EC | 625 | Industrial Relations |
| P | 608 | Psychometrics and Statistics* |
| P | 609 | Research Methods |
| P | 619 | Organizational Behavior |
| P | 620 | Industrial Psychology |
| P | 635 | Psychological Tests and Measurements in Industry |
| P | 640 | Industrial Motivation and Morale |
| P | 645 | Seminar in Industrial/ Organizational Psychology |

Program option** (24 credits)

Total credits: 48

**Undergraduate preparation in statistics is prerequisite.*

*** The choice of electives is made in consultation with the program coordinator in light of the student's academic and professional goals.*

## Program Options

**Option 1 (Thesis)**

| | | |
|---|---|---|
| P | 698/699 | Thesis I and II |

Electives** (18 credits)

*** The choice of electives is made in consultation with the program coordinator in light of the student's academic and professional goals.*

**Option 2 (Internship/Practicum)**

| | | |
|---|---|---|
| P | 693 | Organizational Internship I |
| P | 694 | Organizational Internship II |
| | | *or* |
| P | 678 | Practicum I |
| P | 679 | Practicum II |

Electives** (18 credits)

*** The choice of electives is made in consultation with the program coordinator in light of the student's academic and professional goals.*

**Option 3 (Approved Electives)**

Comprehensive examination required

Electives** (24 credits)

*** The choice of electives is made in consultation with the program coordinator in light of the student's academic and professional goals.*

# Concentration in Industrial-Human Resources Psychology

Students who select this concentration will count these course credits toward the elective courses required in one of the program options listed previously.

| | | |
|---|---|---|
| P | 610 | Program Evaluation |
| P | 644 | Performance Appraisal Systems |

*Plus two of the following:*

| | | |
|---|---|---|
| MG | 645 | Management of Human Resources |
| P | 628 | The Interview |
| P | 641 | Personnel Development and Training |

Total credits: 12

# Concentration in Organizational Development and Consultation

Students who select this concentration will count these course credits toward the elective courses required in one of the program options listed previously.

| | | |
|---|---|---|
| P | 642 | Organizational Change and Development |

| | | |
|---|---|---|
| P | 612 | Consultation Seminar |

*Plus two of the following:*

| | | |
|---|---|---|
| MG | 663 | Leadership and Team Building |
| P | 623 | Psychology of the Small Group |
| P | 624 | Experiential Self-Analytic Group |
| P | 638 | Psychology of Communication and Opinion Change |
| P | 641 | Personnel Development and Training |
| P | 643 | The Psychology of Conflict Management I |

**Total credits: 12**

## Concentration in The Psychology of Conflict Management

**Advisor:** Stuart D. Sidle, Assistant Professor, PhD, DePaul University

Students who select this concentration will count these course credits toward the elective courses required in one of the program options listed previously.

| | | |
|---|---|---|
| P | 643 | The Psychology of Conflict Management I |
| P | 646 | The Psychology of Conflict Management II |

*Plus two of the following:*

| | | |
|---|---|---|
| MG | 667 | Multicultural Issues in the Workplace |
| P | 612 | Consultation Seminar |
| P | 623 | Psychology of the Small Group |
| P | 638 | Psychology of Communication and Opinion Change |
| P | 647 | Industrial and Organizational Psychology in Global Settings |
| PS | 655 | Conflict Resolution |

**Total credits: 12**

# Graduate Certificates

The College of Arts and Sciences offers the following graduate certificates designed as options for persons having a baccalaureate degree, or a master's degree, who want to enroll in a part-time, short, coherent course of study at the graduate level. Those who may not yet be ready to commit themselves to a full-length graduate program, as well as those who already hold a graduate degree but want to pursue additional work in the same or another field, may find that a certificate provides the perfect alternative.

Students applying to the Graduate School to enter a certificate program must complete the Graduate School application form and submit official transcripts showing completion of the undergraduate/baccalaureate degree and two letters of recommendation.

See the Table of Contents for the Academic Policies section of the catalog to find a complete description of the options, regulations, and requirements for study and completion of a graduate certificate.

## Applications of Psychology Certificate

**Advisor:** Michael A. Morris, Professor, PhD, Boston College

The certificate in applications of psychology is designed to assist professionals who wish to acquire specific skills in areas dealing with human services or personnel functions. Study can be tailored to the needs of one whose degree is in a nonpsychological field or of one with a degree in psychology who wishes to broaden his or her skills to a new area of psychology. Courses will be selected depending upon the student's career objectives and academic preparation. The courses may be from the following list, but other courses, independent study, or special topics courses may be chosen where appropriate.

**Any four of the following:**

| | | |
|---|---|---|
| P | 610 | Program Evaluation |
| P | 623 | Psychology of the Small Group |
| P | 625 | Life Span Developmental Psychology |
| P | 628 | The Interview |
| P | 629 | Introduction to Psychotherapy and Counseling |
| P | 632 | Group Treatment and Family Therapy |
| P | 636 | Abnormal Psychology |

| | | |
|---|---|---|
| P | 638 | Psychology of Communication and Opinion Change |
| P | 641 | Personnel Development and Training |
| P | 642 | Organizational Change and Development |

**Total credits: 12**

## Bioinformatics Certificate

**Advisor:** Anthony Melillo, Practitioner-in-Residence, MS, University of New Haven

This certificate program will provide a practical, "hands-on" approach to computer applications in molecular biology and will focus on the major issues concerning representation and analysis of biological sequence and structural information. With a strong foundation in computer science and molecular biology, students will acquire a background in generating, analyzing, and interpreting biological data, as well as the ability to apply such knowledge in biotechnology and medicine. The curriculum is designed to accommodate two convergent audiences: 1) molecular biology students with limited experience in computer systems who wish to upgrade their skills and knowledge in the field of bioinformatics and 2) computer science students with existing computational or mathematical skills who wish to learn how to apply those skills to real biological problems.

The curriculum for this concentration includes five courses (a total of 15 credits), which combine computer science, molecular genetics, and bioinformatics courses.

**Required courses:**

| | | |
|---|---|---|
| CS | 622 | Database Systems |
| MB | 606 | Molecular Genetics/Genomics |
| MB | 620 | Bioinformatics |
| MB | 625 | Advanced Bioinformatics |

*Plus one of the following courses:*

| | | |
|---|---|---|
| CS | 604 | Introduction to Programming/C |
| CS | 610 | Intermediate Programming/C |

**Prerequisites for the certificate:**

The prerequisites are undergraduate molecular biology or biochemistry and college algebra.

## Forensic Psychology Certificate

**Advisor:** James J. Cassidy, Associate Professor, PhD, Hahnemann University; JD, Villanova School of Law

This certificate program, offered by the Psychology and Criminal Justice Departments, is a concentrated program of study designed to prepare individuals who will be responsible for the management and care of offenders in forensic settings. In addition, it is designed to enhance the knowledge and skills of professionals currently working in law enforcement, courts, corrections, or mental health settings. It is also intended to enhance the knowledge base of students in the MA Community Psychology and MS Criminal Justice programs.

**Prerequisites: CJ 601 and CJ 605 or equivalent.**

| | | |
|---|---|---|
| CJ | 623 | Mental Health Law |
| P | 656 | Abnormal Psychology in Forensic Settings |
| P | 657 | Forensic Assessment |
| P | 658 | Forensic Treatment Models |

**Total credits: 12**

## Geographical Information Systems Certificate

**Advisor:** Daniel DePodesta, Practitioner-in-Residence, MBA, Quinnipiac University

The certificate in geographical information systems (GIS) provides professional training in the technology and application of computerized cartography and spatially referenced databases. GIS is an increasingly important technology in environmental sciences, urban and regional planning and management, marketing, criminal justice, communications, and energy and natural resource protection. Coursework provides knowledge of basic and advanced GIS techniques, developing procedures and databases for specific applications, as well as technologies and analyses supporting GIS. The program is flexible in order to accommodate both students new to GIS and those who already have some experience with this technology.

Students entering this program are required to have a working knowledge of personal computers.

| | | |
|---|---|---|
| EN | 640 | Introduction to Geographical Information Systems |
| EN | 641 | Geographical Information System Techniques and Applications I |
| EN | 642 | Geographical Information System Techniques and Applications II |
| EN | 643 | Application of GIS in Environmental Science |
| | | *or* |
| EN | 690 | Research Project |

**Total credits: 12**

Students having previous GIS experience may substitute, with the advisor's approval, other courses for EN 640 and/or EN 641. Suggested substitutions, depending on a student's area of interest, may include, but are not limited to, the following:

| | | |
|---|---|---|
| CJ | 612 | Criminal Justice Management |
| EN | 600 | Environmental Geoscience |
| EN | 608 | Landscape Ecology |
| EN | 620 | Advanced Environmental Geology (4 credits) |
| EN | 690 | Research Project |
| EN | 695 | Independent Study I |
| MK | 609 | Marketing |

## International Relations Certificate

**Advisor:** Natalie J. Ferringer, Professor, PhD, University of Virginia

This certificate is designed to introduce students to elements of international life relevant to the growth of a global political-economic system. Courses will provide increased knowledge and awareness in the area of international relations for corporate executives, teachers, and professionals. Factors such as power, diplomacy, law, trade, monetary affairs, multinational corporations, investment, aid, and differing cultural and geographical characteristics will be examined.

| | | |
|---|---|---|
| PS | 606 | Advanced International Relations |
| PS | 641 | The Politics of the World Economy |

*Plus two of the following:*

| | | |
|---|---|---|
| HS | 607 | World History in the Twentieth Century |
| HS | 670 | Selected Topics |
| HS | 695 | Independent Study |
| IB | 643 | International Business |
| PS | 603 | International Law |
| PS | 604 | Human Rights and the Law |
| PS | 625 | Transnational Legal Structures |
| PS | 628 | Change and Government |
| PS | 645 | Government and the Industrial Sector |
| PS | 670 | Selected Topics |
| PS | 695 | Independent Study |

**Total credits: 12**

## Legal Studies Certificate

**Advisor:** Natalie J. Ferringer, Professor, PhD, University of Virginia

This certificate is designed to provide a background in and orientation to constitutional and legal issues in contemporary American and global society by exploring basic constitutional principles and the levels at which legal conflicts may arise. Students will be introduced to basic principles and practices in the American legal system, including some elements that pertain to international activity, and will learn to recognize areas of potential legal conflict at all levels of the system—legislative, judicial, administrative, and regulatory.

| | | |
|---|---|---|
| PS | 601 | Constitutional Law |
| PS | 610 | Legal Methods I |
| PS | 655 | Conflict Resolution |

*Plus one of the following:*

| | | |
|---|---|---|
| PS | 602 | Civil Liberties and Rights |
| PS | 603 | International Law |
| PS | 604 | Human Rights and the Law |
| PS | 605 | Criminal Law |
| PS | 608 | The Legislative Process |
| PS | 612 | Contracts, Torts, and the Practice of Law |
| PS | 616 | Urban Government |
| PS | 617 | Law, Science, and Ethics |
| PS | 625 | Transnational Legal Structures |
| PS | 626 | Decision Making in the Political Process |

| | | |
|---|---|---|
| PS | 628 | Change and Government |
| PS | 633 | The Political Process and the Aged |
| PS | 635 | Law and Public Health |
| PS | 640 | Law and Education |
| PS | 645 | Government and the Industrial Sector |
| PS | 670 | Selected Topics |
| PS | 695 | Independent Study |

Total credits: 12

## Psychology of Conflict Management Certificate

Advisor: Stuart D. Sidle, Assistant Professor, PhD, DePaul University

This certificate is designed for professionals who wish to develop skills in communication, negotiation, and mediation. Students will learn theoretical models of conflict escalation and resolution in addition to receiving training in basic communication, negotiation, and mediation skills. Skill development will enable students to resolve both personal and professional conflicts more effectively, as well as help build the tools necessary for those interested in becoming mediators or organizational consultants specializing in conflict management.

| | | |
|---|---|---|
| P | 643 | The Psychology of Conflict Management I |
| P | 646 | The Psychology of Conflict Management II |

*Plus two of the following:*

| | | |
|---|---|---|
| MG | 667 | Multicultural Issues in the Workplace |
| P | 612 | Consultation Seminar |
| P | 623 | Psychology of the Small Group |
| P | 638 | Psychology of Communication and Opinion Change |
| P | 647 | Industrial and Organizational Psychology in Global Settings |
| PS | 655 | Conflict Resolution |

Total credits: 12

# COLLEGE OF BUSINESS

Jess S. Boronico, PhD, Dean
Raja Nag, PhD, Associate Dean

The primary mission of the College of Business is to provide high-quality, career-oriented education to students of varied economic and cultural backgrounds, experiences, and academic preparation. We seek to do so through comprehensive programs designed to accommodate a full-time undergraduate and a substantial part-time evening student body and by engaging in teaching, research, and consulting involving both the development and the communication of knowledge. It is the vision of the school to be a regional leader in providing career-oriented, contemporary business education.

As the business environment becomes more complex, the College of Business provides contemporary educational experiences of high quality in order to prepare students to face the challenges of a dynamic world and to meet their responsibilities within a global society. To achieve these goals, we provide career-oriented programs, employing current knowledge and techniques presented in a manner appropriate to the diverse backgrounds and experiences of our graduate students.

The College of Business is divided into six academic departments: the Departments of Accounting, Communication and Marketing, Economics and Finance, Management, Public Management, and Sport/Hospitality and Tourism Management. As of fall 2007, the Department of Quantitative Analysis is a sub-element of the Department of Management.

Through the Graduate School, the College of Business offers an MBA program, an Executive MBA program, and master's degree programs in a number of other business fields. A master's in public administration (MPA) as well as two dual degrees, MBA/MPA and MBA/MS Industrial Engineering, are also available. Master of Science degrees are offered in health care administration, labor relations, management of sports industries, and taxation. In addition, more than a dozen graduate certificates are available for students who seek a short graduate curriculum concentrated in a specific business area.

At the undergraduate level, the College of Business offers associate's and bachelor's degree programs in the departments of accounting, communication, economics and finance, marketing and international business, and management.

# BUSINESS PROGRAMS

*These programs are within the scope of included programs for AACSB candidacy and accreditation review.*

## Master of Business Administration (MBA)

Director MBA: Richard Laria, MBA, Adelphi University

Academic Advisor: Charles N. Coleman, Assistant Professor, MPA, West Virginia University

The MBA curriculum is designed to prepare managers for today's increasingly complex global and multidimensional work environment. It includes a strong focus on leadership, teamwork, and integrative management activities. The program offers flexibility, providing choices within the advanced courses and a variety of functional concentrations with a broad selection of courses offered each trimester. In addition to this MBA program, the university offers two MBA dual degree programs: one combined with the master's program in public administration (MBA/MPA) and one combined with the master's program in industrial engineering (MBA/MSIE).

Students with a recent degree in business may be able to complete the program with as few as 30-36 graduate credits, while other students may require

the maximum 48-54 credits. Because the Graduate School operates on a trimester calendar with three full-length terms each year plus an abbreviated summer session, full-time students may complete their studies in 12 to 22 months.

## Admission Policy

Candidates for admission to the MBA program are required to hold a four-year baccalaureate degree (or equivalent) from an accredited institution. An undergraduate degree in business is not a requirement. Qualified students from all backgrounds are encouraged to submit applications. An admission decision is based on a combination of a student's undergraduate and/or graduate academic performance, professional experience, and letters of recommendation. All students are encouraged to submit GMAT scores in support of their application. Students must be fully accepted to the MBA program prior to first registration.

Documents required for admission are as follows:

- Completed application
- $50.00 nonrefundable fee
- Official transcripts(s)
- Two letters of recommendation
- Resume

Admission requirement:

- Minimum GPA of 2.7 from the graduating institution
  *or*
- GMAT score of 500 or above
  *or*
- Graduate degree from an accredited institution

For detailed information, please contact the Director of MBA Programs at (203) 932-7277 or rlaria@newhaven.edu.

## Curriculum

The MBA curriculum is focused primarily on advanced topics; however, students without previous studies in business will complete a maximum of 18 credits in introductory core courses before proceeding to the 30-36 credits of advanced courses and electives. The program stresses alternate approaches to studies in organizational communication, production, corporate valuation, and organizational change.

Students may choose from a wide variety of alternatives for their advanced elective courses. Concentrations are offered in nine different areas, ranging from accounting to sports management.

Students will begin their studies with the six required Core Courses. Any of these six required Core Courses may be waived on the basis of the student's undergraduate coursework or previous graduate courses, if taken at a regionally accredited institution within the last seven years. Waiver guidelines are outlined on the next pages.

After satisfying the appropriate prerequisites, students proceed to the next level in the program: the six Advanced Courses plus the four elective, or concentration, courses. No waivers are permitted for the 30-36 credits of Advanced Courses plus electives; however, transfer credit toward advanced courses and/or electives may be granted for graduate courses with a grade of "B" (3.0) or better if taken within the last four years at a regionally accredited institution, subject to the transfer policies of the Graduate School. After admission, any graduate courses taken for transfer must have prior approval with a signed Coordinated Course Form.

Completion of the elective portion of the MBA program may be accomplished by taking graduate courses offered through the various departments or programs of the university or by choosing a concentration in a specific area of study. Students should select courses that will enhance their career objectives. Concentrations allow students to develop specialized skills in a particular field, and they are described in the pages immediately following this section. Students taking non-business elective courses must contact the MBA program director for approval and seek academic advice from the graduate program coordinator of the non-business department.

In appropriate cases having special approval, a student may elect to write a thesis. Candidates for the MBA electing to write a thesis must register for a minimum of six thesis credits in the appropriate business department and would substitute these six credits of Thesis I and II for two elective courses in the program. The thesis must show ability to organ-

ize material in a clear and original manner and must present well-reasoned conclusions. Thesis preparation and submission must comply with the Graduate School policy on theses as well as all specific departmental requirements.

Required Courses

Core Courses (18 credits; waivable)

| | | |
|---|---|---|
| A | 620 | Financial Accounting for Managers |
| EC | 601 | Macroeconomics and Microeconomics |
| FI | 601 | Financial Management |
| QA | 604 | Probability and Statistics |
| MG | 637 | Management Process |
| MK | 609 | Marketing |

Advanced Courses (18 credits; not waivable)

| | | |
|---|---|---|
| A | 621 | Managerial Accounting |
| IB | 644 | Managing in Global Markets |
| FI | 602 | Financial Strategy and Valuation |
| MG | 645 | Managing People at Work |
| EC | 629 | Business & Society |
| MG | 669 | Strategic Management |

Electives or Concentration (12-18 credits)

Total credits: 48-54

*Note: Accounting concentration requires 51 credits; Finance concentration-Certified Financial Analyst Track requires 51 credits*

## Waiver Policy

Any of the six required Core Courses may be waived on the basis of appropriate undergraduate or graduate courses taken within the last seven years at a regionally accredited institution. Waivers will be considered at the time of admission; waivers based on a "B" (3.0) or better in the appropriate courses will be considered and granted. Students who seek transfer credit must submit a written request (with a course syllabus, preferably, or course description of the previously completed coursework) to the MBA director during the first semester of attendance. Normally, waivers are decided within the first semester of study. Only courses with grades of "B" or better may be used in meeting waiver guidelines for the required courses. Only required Core Courses may be waived.

A course that has been waived may not be taken for or used for elective credits. No tuition refund or cancellation will be issued for courses taken and subsequently waived.

## Waiver Guidelines

The minimum course requirements, all taken within the last seven years, for waivers are:

| | | |
|---|---|---|
| A | 620: | One course the equivalent of A 220 Intermediate Accounting I |
| EC | 601: | One course in macroeconomics and one course in microeconomics |
| FI | 601: | One upper-division course in corporate finance |
| MG | 637: | One upper-division course in management or organizational behavior |
| MK | 609: | One upper-division course in marketing |
| QA | 604: | Two courses in statistics, or one course in statistics and one course in quantitative business analysis. |

# Concentrations

Within the MBA program students may use the elective credits to concentrate their studies in a specific area. It is recommended, but not required, that concentrations be indicated on the application for admission to the MBA program, or as soon as possible thereafter.

The MBA concentrations and their course requirements are presented on the following pages. Concentrations consist of at least 12 credits. In certain special circumstances, students may be allowed to substitute other appropriate courses for those listed as part of the concentration. Any course substitution for a listed concentration course must be approved in writing by the student's concentration advisor prior to enrollment in the course.

The courses listed for some concentrations include courses that also appear in the Advanced Courses. Students enrolled in a concentration who take any course(s) listed for that concentration to satisfy Advanced Course requirements may not count the same course credits toward the concentration

credit requirements. Instead, the student will take other courses listed in the concentration to satisfy the required concentration credits. The concentrations in finance, international business, and public relations have special requirements which affect the required portion of the curriculum. Students should consult the concentration descriptions and contact the appropriate advisor for additional information.

## Concentration in Accounting

**Concentration Advisor:** Robert E. Wnek, Professor, BSBA, Villanova University; JD, Widener University School of Law; LLM, Boston University School of Law; CPA

The concentration in the accounting program is recommended for those MBA students who desire an accounting specialization.

**Required Courses**

| | | |
|---|---|---|
| A | 630 | Topics in Corporate Financial Reporting* |
| A | 654 | Financial Statement Reporting and Analysis |
| A | 652 | Auditing and Assurance Services Seminar |
| A | 604 | Taxation of Business Entities |

Plus any Accounting Elective

**Students who have had two intermediate accounting undergraduate courses will substitute an accounting taxation elective for A 630.*

**Total Credits: 15**

Students who have successfully completed six credits of Intermediate Accounting with a B average may substitute an Accounting or Taxation course.

For students who have an undergraduate accounting degree or the equivalent of an accounting minor, we offer the fifth year CPA exam track.

### Fifth Year CPA Exam Track

| | | |
|---|---|---|
| A | 652 | Auditing and Assurance Services Seminar |

Any three Accounting or Taxation Electives

**Total credits in concentration: 12**

One Accounting or Taxation elective to be substituted for A 621 Managerial Accounting.

The fifth year CPA Exam Track is intended for those students desiring to complete the 150-hour academic credit requirement to qualify to take the CPA exam. Students should consult with their advisor concerning their specific course needs to qualify, in light of academic course completions.

## Concentration in Business Policy and Strategic Leadership

**Concentration Advisor:** Gil B. Fried, Professor, JD, Ohio State University

The concentration in business policy and strategic leadership is designed to prepare managers to deal with the increasing emphasis given by companies to the development and implementation of innovative global business strategies. The program focuses on strategic concepts and processes and relates them to general management and functional supervision. A grounding in formulation of business policy and strategy for both internal growth and growth by mergers and acquisitions is provided.

**Required Courses**

| | | |
|---|---|---|
| MG | 663 | Leadership and Team Building |
| MG | 664 | Organizational Effecriveness |

*Plus two of the following:*

| | | |
|---|---|---|
| MG | 650 | Entrepreneurship |
| MG | 655 | Corporate Governance and Business Strategy |
| MG | 656 | Integrating the Enterprise |
| MG | 662 | Organizational Theory |
| P | 641 | Personnel Development and Training |
| P | 642 | Organizational Change and Development |
| P | 647 | Industrial and Organizational Psychology in Global Settings |

**Total Credits: 12**

## Concentration in Finance

**Concentration Advisor:** Steven J. Shapiro, Professor, PhD, Georgetown University

The goal of the finance concentration is to provide students with advanced study in financial serv-

ices and corporate finance. The concentration emphasizes the understanding and application of concepts from finance that will be useful in future career growth.

| | | |
|---|---|---|
| FI | 610 | Capital Market Theory |
| FI | 611 | Equity Market Valuation and Analysis |
| FI | 620 | Capital Markets and the Valuation of Fixed Income Securities |

*Plus two of the following:*

| | | |
|---|---|---|
| FI | 605 | Data Evaluation and Modeling |
| FI | 625 | Advanced Capital Market Issues |
| FI | 630 | Corporate Financial Analysis and Applications |
| FI | 632 | International Financial Management |

**Total Credits: 15**

**Optional Track for Prospective Chartered Financial Analyst (CFA) Candidates**

The optional track is designed for students interested in sitting for the CFA exams. The CFA track is designed to give students the content material covered in the CFA Level One exam. The CFA designation is highly desirable for anyone who wishes to be competitive when pursuing positions as analysts in the financial services industry.

Students planning on pursuing the CFA track take the following six courses:

| | | |
|---|---|---|
| FI | 605 | Data Evaluation and Modeling |
| FI | 610 | Capital Market Theory |
| FI | 611 | Equity Market Valuation and Analysis |
| FI | 620 | Capital Markets and the Valuation of Fixed Income Securities |
| FI | 625 | Advanced Capital Market Issues |
| A | 654 | Financial Statements: Reporting and Analysis |

**Total Credits: 18**

## Concentration in Global Marketing and E-Commerce

**Concentration Advisor:** Ben B. Judd, Professor, PhD, University of Texas at Arlington

This concentration is designed to prepare managers to deal with the latest methods of analysis related to global marketing. These include basic techniques and skills, such as adapting to new political and cultural environments, which are not normally covered by traditional courses. It is strongly recommended that students contact the global marketing advisor as early as possible to program the appropriate sequence of courses.

**Required Courses**

| | | |
|---|---|---|
| IB | 651 | International Marketing |
| MK | 639 | Marketing Research and Information Systems |

**One international business topic course:**

| | | |
|---|---|---|
| FI | 632 | International Financial Management |

*or*

IB Elective

**One marketing topic course:**

| | | |
|---|---|---|
| MK | 616 | Buyer Behavior |

*or*

Marketing Elective

**One capstone course:**

| | | |
|---|---|---|
| MK | 643 | Product Management |

*or*

| | | |
|---|---|---|
| MK | 641 | Marketing Management |

**Total Credits: 15**

## Concentration in Human Resource Management

**Concentration Advisor:** Gil Fried, Professor, JD, Ohio State University

This concentration is designed for the human resource professional or the individual in another field who aspires to work in human resources. It provides an overview of subfunctions (such as training, labor relations, and compensation) in greater depth.

Students are provided with real-world skills by the use of industry experts as adjuncts and by the introduction of unique courses such as employment law, benefits administration, finance for human resources managers, and special topics designed to provide practical and experiential learning.

**Four of the following:**

| | |
|---|---|
| MG 627 | Human Resource and Financial Decision Making |
| MG 663 | Leadership and Team Building |
| MG 665 | Compensation Administration |
| MG 667 | Multicultural Issues in the Workplace |
| MG 671 | Employment Law |
| P 641 | Personnel Development and Training |
| P 642 | Organizational Change and Development |
| P 644 | Performance Appraisal System |

**Total Credits: 12**

## Concentration in Sports Management

**Concentration Advisor:** Gil B. Fried, Professor, JD, Ohio State University

As sports have grown as an industry, the need for sports managers with specialized business skills and training has increased. This concentration is designed for students who would like to pursue careers in the sports industry as well as for those who already work in the industry who are seeking career advancement. The focus of the program is on business applications in the key areas of facility management, sport finance, and collegiate athletic administration.

| | |
|---|---|
| MG 610 | The Sports Industry |

*Plus three of the following:*

| | |
|---|---|
| CO 632 | Contemporary Public Relations Issues |
| EC 687 | Collective Bargaining |
| MG 611 | Sport Industry Marketing, Promotion, and Public Relations |
| MG 612 | Sports Law |
| MG 613 | Sports Facility Management |
| MG 617 | Applied Fiscal Management for Sports and Facility Managers |
| MG 618 | College Sports Administration |
| MG 694 | Internship |
| PS 612 | Contracts, Torts, and the Practice of Law |
| THM 920 | Strategies for Event Planning |

**Total credits: 12**

See Table of Contents for the MS in Management of Sports Industries and the certificare in management of sports industries.

# Master of Business Administration Emerging Leaders Program

**Director:** Richard Laria, MBA, Adelphi University

The Emerging Leaders MBA requires a bachelor's degree and two or more years of business or professional experience. In less than two years a cohort of 15 to 25 MBA students can complete an MBA degree that develops the skills, knowledge, and values today's manager must possess to be successful. The program has a modular curriculum which includes core and advanced courses, each taken in a five-week increment. Each course is a building block for the next. The same group of students remains together for the entire seminar-style program. Courses are held on Saturdays or weekdays. Classes break for all major holidays and for 5 to 6 weeks in the summer. Classes meet in Waterbury, New London, and Stratford.

### Admission Policy

Candidates for admission to the MBA program are required to hold a four-year baccalaureate degree (or equivalent) from an accredited institution. An undergraduate degree in business is not a requirement; qualified students from all backgrounds are encouraged to submit applications. An admission decision is based on a combination of a student's undergraduate and/or graduate academic performance, professional and/or business experience, and two letters of recommendation. Students must be fully accepted to the MBA program prior to first registration. A minimum of 2 years of administrative, managerial, or professional work experience is required for admission to this program.

**Required documents for admission are as follows:**

- Completed application
- $50.00 nonrefundable fee
- Official transcript(s)
- Two letters of recommendation
- Minimum GMAT score of 500 (if required; see waiver criteria)
- Resume

**GMAT may be waived for students with one of the following:**

- Graduate degree from an accredited institution
  *or*
- Undergraduate degree grade point average of at least 2.7

For detailed information, please contact the Director of MBA Programs at (203) 932-7277 or rlaria@newhaven.edu.

### Curriculum

The Emerging Leaders curriculum is cohort-style, with the same group of students remaining together throughout the entire program in a collaborative learning environment. No course waivers or transfer credits are granted in this program. Students will begin their studies with 18 credits of core courses followed by 30 credits of advanced courses.

**Modules**

| | |
|---|---|
| CO 620 | Applied Communications |
| EC 601 | Macroeconomics and Microeconomics |
| MK 609 | Marketing |
| QA 604 | Probability & Statistics |
| MG 637 | Management Process |
| A 620 | Financial Accounting |
| LA 674 | Business Law |
| MG 645 | Managing People at Work |
| FI 601 | Financial Management |
| MK 643 | Product Management |
| FI 602 | Financial Strategy & Valuation |
| IB 644 | Managing the Global Economy |
| A 621 | Managerial Accounting |
| EC 629 | Business & Society |
| MG 669 | Strategic Management |
| MG 686 | Global Business Simulation |

**Total credits:** 48

# Executive Master of Business Administration (Executive MBA)

The Executive Master of Business Administration is a fully accredited, graduate-level degree program designed for middle- and upper-level professionals who have meaningful managerial responsibility. Applicants are required to hold a baccalaureate degree from an accredited institution. The program provides the opportunity to earn an MBA degree, the quality standard in business education, in two years without career interruption.

The program is uniquely scheduled so that working professionals can participate with maximum convenience for themselves, their families, and their companies. Each class progresses through the program as a group, thus providing an opportunity for a continuing exchange of ideas and information. Individual participation is emphasized through class discussions and interaction and cooperation with other professionals in the class. The program fosters a direct connection between what is learned in class and what is applied in business. Classes meet one afternoon per week for six hours. The university also offers a Saturday class beginning every two years. The program is convenienr, enjoyable, and personalized.

Generally, no transfer credit is accepted for admission to the Executive MBA program. Admission is by a special application available from the Director. No GMAT is required.

Prospective candidates are encouraged to apply as early as possible. New classes begin in September and February of each year. The admission procedure includes a screening interview with the Director and review of the applicant's credentials by the Faculty Selection Committee. Each candidate is considered on the basis of the special application form, official transcripts from all undergraduate and graduate schools attended, two business-related letters of recommendation, and a letter of organizational support.

The program invites both individual and employer-sponsored applications. Information and application forms are available from the Office of the Executive MBA Director, Room 200, Echlin Hall,

(203) 932-7386, or fax (203) 932-7261, or email: lcarlone@newhaven. edu.

### Required Courses

The program consists of 18 modules, scheduled into two academic calendar years, plus either a master's-level research paper or a domestic or international seminar. Classes meet from 2:30 to 8:30 PM one weekday each week in designated conference facilities. Each module is five sessions in length and has the value of 3 credits, with the exception of the two full days for the 2- credit Communication Process module. Participants must be prepared to attend all classes, except for emergencies. Students must also be prepared to devote significant additional time for class preparation and reading assignments.

## Modules

**First Year**

| | |
|---|---|
| EXID 903 | The Communication Process (2 credits) |
| EXID 915 | Quantitative Decision Making |
| EXID 918 | Managerial Economics |
| EXID 912 | Financial Accounting |
| EXID 921 | Executive Management and Leadership |
| EXID 924 | Financial Management I |
| EXID 927 | Financial Management II |
| EXID 942 | Managerial Accounting |
| EXID 930 | Marketing Practice |
| EXID 998 | Marketplace–Business Simulation |
| EXID 954 | Organizational Development |

**Second Year**

| | |
|---|---|
| EXID 951 | Marketing Management |
| EXID 933 | Managing the Global Marketplace |
| EXID 939 | Operations Management |
| EXID 960 | Information Management |
| EXID 948 | Business Law |
| EXID 909 | Business and Government Relations |
| EXID 999 | Special Research Topics *or* |
| EXID 997 | The Washington Campus—How Washington Works/International Seminar |
| EXID 957 | Corporate Policy and Strategy |

**Total credits: 56**

# Management of Sports Industries

**Coordinator:** Gil B. Fried, Professor, Management, JD, Ohio State University

The main objective of the master's degree program in management of sports industries is to provide the advanced knowledge and skills necessary for successful careers in the business of sports. This master's program is the first of its kind offered in Connecticut and one of only a few such programs offered by schools of business across the nation. Our focus is to prepare students for careers in a wide variety of sport-related businesses and/or facility management. Such career choices might include:

- collegiate athletic administration
- sports marketing
- sports finance
- personnel management
- recreation management
- major and minor league sports
- facility management
- space allocation and event booking
- construction and renovation
- facility maintenance and safety
- sales and box office management.

These career choices are often identified through an aggressive internship program with numerous professional teams/leagues, college athletic departments, sports organizations, and organizations such as ESPN, MLS, MLB and WWE.

## Admission Policy

Candidates for admission are required to hold a four-year baccalaureate degree (or equivalent) from an accredited institution. An undergraduate degree in business is not a requirement; qualified students from all backgrounds are encouraged to submit applications. An admission decision is based on a combination of a student's undergraduate and/or graduate academic performance, professional experience, and letters of recommendation. An interview may be arranged at the request of the applicant.

For detailed information, please contact the Director of the Management of Sports Industries Programs.

## MS, Management of Sports Industries

A total of 36 credit hours is required for completion of the master of science degree in management of sports industries. The program consists of four business core courses, four sports/facility management core courses, and four sports management elective courses or four facility management concentration courses.

**Business Core (12 credits)**

The following required foundation business courses may be waived based on appropriate graduate or undergraduate courses completed with a grade of "B" or better at an accredited institution. (See waiver criteria under MBA program.) If all four business courses are waived, students are required to take two additional elective courses to meet the minimum 30-credit residency requirement for the awarding of the master's degree.

| | | |
|---|---|---|
| A | 620 | Financial Accounting for Managers |
| EC | 601 | Macroeconomics and Microeconomics |
| MG | 637 | Management Process |
| MK | 609 | Marketing |

**Sports/Facility Management Core** (12 credits)

| | | |
|---|---|---|
| MG | 611 | Sport Industry Marketing, Promotion and Public Relations |
| MG | 612 | Sports Law |
| MG | 617 | Applied Fiscal Management for Sports and Facility Managers |
| MG | 645 | Management of Human Resources |

Plus Electives or Concentration (12 credits)

### Electives

Within the elective sector of the program, students must enroll in a required internship (MG 694) designed to provide appropriate work experience in a sports/sport-related industry. Students are required to produce a comprehensive, analytic report documenting the internship experience. In special cases, requiring written approval of the program coordinator, students who already have extensive field/work experience may replace the internship with an appropriate, approved research project (MG 690).

**Any of the following (totaling 12 credits)**

| | | |
|---|---|---|
| E | 659 | Writing and Speaking for Professionals |
| IE | 661 | Facility Infrastructure |
| MG | 610 | The Sports Industry |
| MG | 613 | Sports Facility Management |
| MG | 618 | College Sports Administration |
| MG | 694 | Internship (3-6 credits) |
| SH | 602 | Safety Organization and Administration |
| THM | 920 | Strategies for Event Planning |

**Total credits: 36**

## Concentration in Facility Management

The university, in conjunction with the International Association of Assembly Managers (IAAM), has developed a concentration endorsed by the IAAM, and its more than 3,800 members. The focus is on how to manage large public assembly facilities such as stadiums and arenas. Topics covered include such specialities as facility financing, community marketing, field maintenance, and crowd management.

For students who choose to complete the master's program with a concentration in facility management, the program includes the four business core courses, the four sports/facility management core courses, and four of the concentration courses listed below, including MG 613 and a required internship (MG 694) designed to provide appropriate work experience in facility management. Students are required to produce a comprehensive, analytic report documenting the internship experience. In special cases, requiring written approval of the program coordinator, students who already have extensive field/work experience may replace the internship with an appropriate, approved research project (MG 690).

| | | |
|---|---|---|
| MG | 613 | Sports Facility Management |
| MG | 694 | Internship (3-6 credits) |

*Plus two of the following:*

| | | |
|---|---|---|
| E | 659 | Writing and Speaking for Professionals |
| IE | 661 | Facility Infrastructure |
| MG | 610 | The Sports Industry |
| MG | 618 | College Sports Administration |
| SH | 602 | Safety Organization and Administration |
| THM | 920 | Strategies for Event Planning |

**Total credits: 12**

See the Table of Contents for the MBA concentration in management of sports industries and the certificate in management of sports industries.

# Taxation

**Coordinator:** Robert E. Wnek, Professor, BSBA, Villanova University; JD, Widener University School of Law; LLM, Boston University School of Law; CPA

The decision by government to utilize its taxing authority to pursue a variety of economic and social goals has led to the development of a complex body of tax law. Given the dynamic state of society's economic and social goals, the body of tax law characteristically exists in a continual state of change. The complexity of tax law is significant because of its influence on the economic decision-making process and because of its impact on the successful achievement of society's goals. Tax consequences have been and will continue to be an important financial consideration.

## Admission Policy

Admission to the program is available to Accountants, CPAs, attorneys, business people and those holding an undergraduate degree from an accredited institution.

Admission is based primarily on an applicant's undergraduate record and work experience; however, the promise of academic success is the essential factor for admission.

## MS, Taxation

A total of 30 credits hours, including a research project, are required for the Master of Science in Taxation degree. The transfer of credit from other institutions will be permitted subject to the Graduate School policy on transfer credit and residency requirements detailed elsewhere in this catalog.

Accountants and practitioners wishing to improve or update their skills, or practicing CPAs in need of continuing education credits and others seeking to expand their tax backgrounds but uncertain about pursuing a Master's in Taxation, should consider pursuing a Taxation certificate as an alternative.

Required Courses

| | | |
|---|---|---|
| A | 601 | Federal Income Taxation I |
| A | 602 | Federal Income Taxation II |
| A | 603 | Tax Research and Writing |
| A | 604 | Taxation of Business Entities |
| A | 605 | Partnership and Limited Liability Company Income Taxation |
| A | 606 | Corporate Income Taxation |
| A | 607 | Qualified Plans |
| A | 608 | Taxation of Estates, Gifts, and Trusts |
| A | 609 | Tax Practice and Procedure |
| A | 615 | Research Project in Taxation |

Electives:

| | | |
|---|---|---|
| A | 610 | International Taxation |
| | | *or* |
| A | 611 | State and Local Taxation |

**Total credits: 30**

# NON-BUSINESS PROGRAMS

*These programs are not within the scope of included programs for AACSB candidacy and accreditation review.*

## Public Administration (MPA)

**Coordinator:** Charles N. Coleman, Assistant Professor, MPA, West Virginia University

The general purpose of the master of public administration degree is the training of men and women at the graduate level for public service careers. Specifically, the program strives to:

- equip students with modern analytic and quantitative tools of decision making and their application to complex problems of government and nonprofit organizations;
- expose students to the wide range of administrative and managerial problems and responsibilities in the public sector; and
- increase the student's knowledge and skills in the particular management functions of budgeting, planning, public policy formulation, public finance, public personnel administration, and collective bargaining.
- The College of Business, Department of Public Management hosts a chapter of the Public Administration Honorary Society (Pi Alpha Alpha). The National Association of Schools of Public Affairs and Administration awarded the chapter to the university in 2003 after a rigorous examination of the quality of UNH's Public Administration Program.

### Required Courses

The program consists of 42 graduate credit hours required of candidates for the MPA degree.

| | | |
|---|---|---|
| EC | 601 | Macroeconomics and Microeconomics |
| PA | 601 | Principles of Public Administration |
| PA | 602 | Public Policy Formulation and Implementation |
| PA | 604 | Communities and Social Change |
| PA | 611 | Research Methods in Public Administration |
| PA | 620 | Personnel Administration and Collective Bargaining in the Public Sector |
| PA | 625 | Administrative Behavior |
| PA | 632 | Public Finance and Budgeting |
| PA | 690 | Research Seminar |

Electives or Concentration (five courses)

**Total credits:** 42

### Concentration in City Management

The courses selected for this concentration will enable local government practitioners to develop and make better use of their personnel and budgetary resources. This ability is especially important today, as the federal government is reducing its fiscal support of local governments.

Students choosing the concentration in city management will take the required core curriculum of nine courses and follow the city management concentration in lieu of their five elective courses.

| | | |
|---|---|---|
| PA | 630 | Fiscal Management for Local Government |
| PA | 661 | Problems of Metropolitan Areas |
| PS | 616 | Urban Government |

*Plus two of the following:*

| | | |
|---|---|---|
| E | 659 | Writing and Speaking for Professionals |
| EC | 665 | Urban and Regional Economic Development |
| P | 610 | Program Evaluation |
| PA | 670 | Selected Topics |
| SO | 610 | Urban Sociology |

**Total credits:** 15

## Concentration in Community-Clinical Services

This concentration is designed to prepare students for administrative careers in clinical, mental health, and related human service settings. The administration of programs within the contexts of social and community environments is stressed. Students will learn how to deliver services effectively within these turbulent environments.

Students choosing the community-clinical services concentration take the core curriculum of nine courses and the four courses in the concentration plus one additional elective course.

| | | |
|---|---|---|
| P | 605 | Survey of Community Psychology |
| P | 629 | Introduction to Psychotherapy and Counseling |
| P | 632 | Group Treatment and Family Therapy |

*Plus one of the following:*

| | | |
|---|---|---|
| MG | 640 | Management of Health Care Organizations |
| MG | 663 | Leadership and Team Building |
| MG | 664 | Organizational Effectiveness |

*Plus one additional elective*

**Total credits: 12**

## Concentration in Health Care Management

This concentration is designed for those currently in health care management or those who anticipate a career in the field. Courses provide students with the conceptual and practical skills necessary for management of a health care organization.

Students choosing the health care concentration will take the core curriculum of nine courses and follow the health care concentration in lieu of their five elective courses.

| | | |
|---|---|---|
| MG | 640 | Management of Health Care Organizations |
| PA | 641 | Financial Management of Health Care Organizations |
| PS | 635 | Law and Public Health |

*Plus two of the following:*

| | | |
|---|---|---|
| E | 659 | Writing and Speaking for Professionals |
| MG | 630 | Management Information Systems in Health Care |
| PA | 642 | Health Care Delivery Systems |
| PA | 643 | Health and Institutional Planning |
| PA | 644 | Administration of Programs and Services for the Aged |
| PA | 645 | Health Care Economics and Finance |
| PA | 646 | Organization and Management of Long-Term Care Facilities |
| PA | 647 | Alternative Health Care Delivery Systems |
| PA | 648 | Contemporary Issues in Health Care |
| PA | 651 | Health Care Ethics |
| PA | 652 | Introduction to Managed Care |
| PA | 653 | Cost Containment in Health Care |
| PA | 657 | Health Care Reimbursements |
| PA | 659 | Human Resource Planning in Health Care |
| PA | 664 | Survey of Medical Group Management |
| PA | 670 | Selected Topics |

**Total credits: 15**

See the Table of Contents for the MS degree in Health Care Administration, the MBA concentration in this field, and the certificates in health care management and long-term health care.

## Concentration in Long-Term Health Care

This program is approved by the Department of Health Services, State of Connecticut, as a course of study in long-term health care. Students who complete the concentration's courses are eligible to take the state licensing examination for long-term care administration, preparing individuals for participation in this area of expanding opportunities for health care practitioners.

In the following sequence, PA 646 must be taken before or concurrently with PA 681 or PA 683; PA 682

must be taken after PA 681 and PA 646. No waivers, substitutions, or transfer credits are permitted in this concentration.

As shown below, there are two options for the Concentration in Long-Term Care. Please contact the Program Coordinator prior to selecting an option as the State of Connecticut has different requirements for each option.

**Option I:**

| | | |
|---|---|---|
| PA | 641 | Financial Management of Health Care Organizations |
| PA | 646 | Organization and Management of Long-Term Care Facilities |
| PA | 681 | Long-Term Health Care Internship I |
| PA | 682 | Long-Term Health Care Internship II |

One Health Care Elective

**Total Concentration credits: 15**

**Total Program credits: 42**

**Option II:**

| | | |
|---|---|---|
| PA | 641 | Financial Management of Health Care Organizations |
| PA | 646 | Organization and Management of Long-Term Care Facilities |
| PA | 683 | Long-Term Health Care Internship |

Two Health Care Electives

One Restricted Elective

**Total Concentration credits: 18**

**Total Program credits: 45**

## Concentration in Personnel and Labor Relations

The concentration in personnel and labor relations is designed to meet the need for better trained personnel and labor relations specialists in the public sector. The public sector has experienced a growth in union membership but has not had a corresponding growth in the capability to deal with public sector/union relationships. In addition, the courses in this concentration will provide training for public administrators in areas such as employee motivation, organizational change, and group dynamics.

Students choosing this concentration will take the required core curriculum of nine courses and follow the personnel and labor relations concentration in lieu of their five elective courses.

| | | |
|---|---|---|
| MG | 645 | Management of Human Resources, *or* |
| SH | 602 | Safety Organization and Administration |

*Plus two of the following:**

| | | |
|---|---|---|
| EC | 625 | Industrial Relations |
| EC | 627 | Economics of Labor Relations |
| EC | 687 | Collective Bargaining |

*Plus two of the following:***

| | | |
|---|---|---|
| CO | 621 | Managerial Communication |
| E | 659 | Writing and Speaking for Professionals |
| MG | 664 | Organizational Effectiveness |
| P | 620 | Industrial Psychology |
| P | 628 | The Interview |
| P | 632 | Group Treatment and Family Therapy |
| P | 640 | Industrial Motivation and Morale |
| P | 642 | Organizational Change and Development |
| P | 643 | The Psychology of Conflict Management I |
| P | 646 | The Psychology of Conflict Management II |

**Total credits: 15**

**Prerequisite for this group: EC 601 Macroeconomics and Microeconomics or permission of the MPA coordinator.*

***Prerequisite for this group: PA 625 Administrative Behavior or permission of the MPA coordinator.*

# Public Administration Dual Degree Program (MBA/MPA)

**Coordinator:** Charles N. Coleman, Assistant Professor of Management, MPA., West Virginia University

The MBA/MPA dual degree program is designed for those whose interests or career objectives are

focused on both the public and private sectors of the economy. The program broadly stresses the use of management skills and analytic techniques applied to business, industrial, governmental, and not-for-profit organizations.

## MBA/MPA Dual Degree

The MBA/MPA program consists of 75 credit hours. Up to 15 of these may be waived on the basis of undergraduate coursework, leaving a minimum requirement of 60 credit hours. All waivers must be approved in writing by the appropriate department and are conditional upon subsequent academic performance.

Graduate credit may be transferred from other accredited institutions subject to the Graduate School policy on transfer credit detailed elsewhere in this catalog. In all cases, the residency requirement for the two degrees shall be 60 credit hours completed at the University of New Haven. Within these 60 credit hours, a minimum of 21 must be earned in business courses and a minimum of 21 in public administration courses.

### Project/Thesis Requirement

Students must choose one of two alternatives for completion of the final six credits of coursework in the MBA/MPA dual degree curriculum. Most students will take the two capstone/research project courses PA 690 Research Seminar and MG 669 Strategic Management. Alternatively, students may elect to take the two-course, six-credit thesis option (Thesis I and II). If the thesis option is selected, the thesis must show ability to organize material in a clear and original manner and to present well-reasoned conclusions. Thesis preparation and submission must comply with the Graduate School policy on theses as well as all specific department requirements.

**Required Courses**

**Business Core Courses (waivable)***

| | | |
|---|---|---|
| A | 620 | Financial Accounting for Managers |
| EC | 601 | Macroeconomics and Microeconomics |
| FI | 601 | Financial Management |
| MG | 637 | Management Process |
| MK | 609 | Marketing |
| QA | 604 | Probability and Statistics |

**Advanced Business Courses (not waivable)**

| | | |
|---|---|---|
| A | 621 | Managerial Accounting |
| FI | 602 | Corporate Valuation and Strategy |
| IB | 644 | Managing in Global Markets |
| MG | 645 | Management of Human Resources |
| EC | 629 | Business and Society |
| MG | 669 | Strategic Management |

Business Electives (three courses)

**Public Administration Courses**

| | | |
|---|---|---|
| PA | 601 | Principles of Public Administration |
| PA | 602 | Public Policy Formulation and Implementation |
| PA | 604 | Communities and Social Change |
| PA | 611 | Research Methods in Public Administration |
| PA | 620 | Personnel Administration and Collective Bargaining in the Public Sector |
| PA | 625 | Administrative Behavior |
| PA | 632 | Public Finance and Budgeting |
| PA | 690 | Research Seminar |

**Public Administration Electives**

(two courses)

**Total credits: 75**

**Up to five of the six Business Core Courses (not more than 15 credits) may be waived by students who meet the waiver guidelines established for these courses within the MBA program; see MBA program for information.*

# Health Care Administration

**Coordinator:** Charles N. Coleman, Assistant Professor, MPA, West Virginia University

This program of study, leading to the master of science degree, is designed to give students the best possible preparation for careers in health care administration. The health care field is unique in that it functions in a highly regulated yet highly competitive environment. The core courses in this degree program provide students with an appreciation of

the past, present, and future of health care administration. The concentrations allow students to specialize in long-term care, human resource management in health care, medical group management, health care marketing, health policy and finance, or managed care.

In addition to earning the advanced academic degree, students who complete the concentration in long-term care become eligible to take the State of Connecticut exam for certification as a long-term care administrator.

## MS, Health Care Administration

A total of 42 graduate credit hours is required for completion of the master of science in health care administration. The program consists of nine required courses plus five additional courses which may be taken as unrestricted electives or used to complete one of the six concentrations in the master's program.

Students entering this program who lack adequate preparation in quantitative techniques may be required to undertake additional study in order to satisfy a prerequisite requirement. Adequate preparation is defined as satisfactory completion of three credit hours of introductory statistics.

**Required Courses**

| | | |
|---|---|---|
| MG | 630 | Management Information Systems in Health Care |
| MG | 640 | Management of Health Care Organizations* |
| PA | 611 | Research Methods |
| PA | 625 | Administrative Behavior |
| | | *or* |
| P | 619 | Organizational Behavior |
| PA | 641 | Financial Management of Health Care Organizations |
| PA | 651 | Health Care Ethics |
| PA | 669 | Health Care Policy, Planning, and Execution |
| PA | 690 | Research Seminar |
| PS | 635 | Law and Public Health |

Plus 5 electives or concentration courses

**Total credits: 42**

**MS Health Care students may use MG 640 in lieu of MG 637 to satisfy listed prerequisites for graduate courses.*

## Concentration in Health Care Marketing

| | | |
|---|---|---|
| CO | 623 | Communication in Health Care |
| CO | 631 | Public Information Dynamics |
| CO | 632 | Contemporary Public Relations Issues |
| MK | 609 | Marketing |
| | | *or* |
| MK | 641 | Marketing Management |
| MK | 638 | Competitive Marketing Strategy |

**Total credits: 15**

## Concentration in Health Policy and Finance

| | | |
|---|---|---|
| PA | 602 | Public Policy Formulation and Implementation |
| PA | 645 | Health Care Economics and Finance |
| PA | 653 | Cost Containment in Health Care |

*Plus two of the following:*

| | | |
|---|---|---|
| A | 620 | Financial Accounting for Managers |
| PA | 648 | Contemporary Issues in Health Care |
| PA | 652 | Introduction to Managed Care |
| PA | 657 | Health Care Reimbursements |
| PS | 626 | Decision Making in the Political Process |

**Total credits: 15**

## Concentration in Human Resource Management in Health Care

| | | |
|---|---|---|
| MG | 645 | Management of Human Resources |

*Plus four of the following:*

| | | |
|---|---|---|
| CO | 623 | Communication in Health Care |
| EC | 625 | Industrial Relations |
| P | 641 | Personnel Development and Training |
| P | 642 | Organizational Change and Development |

| | | |
|---|---|---|
| PA | 659 | Human Resource Planning in Health Care |

**Total credits: 15**

## Concentration in Long-Term Care

As shown below, there are two options for the Concentration in Long-Term Care. Please contact the Program Coordinator prior to selecting an option as the State of Connecticut has different requirements for each option.

### Option I:

| | | |
|---|---|---|
| PA | 646 | Organization and Management of Long-Term Care Facilities |
| PA | 681 | Long-Term Health Care Internship I |
| PA | 682 | Long-Term Health Care Internship II |

*Plus two of the following:*

| | | |
|---|---|---|
| P | 625 | Life Span Development Psychology |
| PA | 602 | Public Policy Foundation and Implementation |
| PA | 644 | Administration of Programs and Services for the Aged |
| PS | 633 | The Political Process and the Aged |
| SH | 602 | Safety Organization and Administration |
| SO | 651 | Social Gerontology |

**Total Concentration credits: 15**

**Total Program Credits: 42**

### Option II:

| | | |
|---|---|---|
| PA | 646 | Organization and Management of Long-Term Care Facilities |
| PA | 683 | Long-Term Health Care Internship |

*Plus four of the following:*

| | | |
|---|---|---|
| P | 625 | Life Span Development Psychology |
| PA | 602 | Public Policy Foundation and Implementation |
| PA | 644 | Administration of Programs and Services for the Aged |
| PS | 633 | The Political Process and the Aged |
| SH | 602 | Safety Organization and Administration |
| SO | 651 | Social Gerontology |

One Health Care Elective

**Total Concentration credits: 18**

**Total Program Credits: 45**

## Concentration in Managed Care

| | | |
|---|---|---|
| PA | 647 | Alternative Health Care Delivery Systems |
| PA | 652 | Introduction to Managed Care |
| PA | 653 | Cost Containment in Health Care |

*Plus two of the following:*

| | | |
|---|---|---|
| CO | 623 | Communication in Health Care |
| CO | 632 | Contemporary Public Relations Issues |
| MK | 609 | Marketing |
| MK | 638 | Competitive Marketing Strategy |

**Total credits: 15**

## Concentration in Medical Group Management

| | | |
|---|---|---|
| PA | 652 | Introduction to Managed Care |
| PA | 657 | Health Care Reimbursements |
| PA | 664 | Survey of Medical Group Management |

*Plus two of the following:*

| | | |
|---|---|---|
| A | 620 | Financial Accounting for Managers |
| MG | 645 | Management of Human Resources |
| MG | 665 | Compensation Administration |
| PA | 653 | Cost Containment in Health Care |

**Total credits: 15**

In addition to the master of science program, health care concentrations are available in both the MBA and MPA programs, as are graduate certificates in the health care field. See Table of Contents to locate these other related programs.

# Labor Relations

**Coordinator:** Charles N. Coleman, Assistant Professor, MPA, West Virginia University

Over the past several decades, environmental forces have created a demand for greater sophistication and professionalism from those responsible for personnel functions within all organizations, public or private, profit or nonprofit, unionized or not. More and more companies and institutions are requiring the services of people conversant with both the large body of available tools and the constraints that have evolved during this period. The program leading to the master of science degree in labor relations represents a flexible response to this demand.

As a management and behavioral science discipline, labor relations is concerned with all aspects of the employment relationship and, in particular, with the organization's maintenance of the human resources necessary to achieve organizational objectives. As an academic discipline and profession, labor relations is an interdisciplinary, problem-solving field that attempts to maintain harmony and resolve conflicts among the four major parties to the employment relationship: employees, employers, government and, where applicable, unions.

The MS in labor relations program is designed for people employed in or aspiring to positions in various kinds of organizations in the fields of employment, training and development, wage and salary administration, employee services and benefits, labor-management relations, job and organizational design, labor economics, and manpower planning.

## Admission Policy

Candidates for admission are required to hold a baccalaureate degree from an accredited institution of higher education. It is preferable but not an absolute necessity that the undergraduate degree be in business administration, public administration, or a social or behavioral science (e.g., economics, history, political science, psychology, or sociology). Application for admission is also open to full-time professionals in personnel and labor relations holding a baccalaureate degree in any field from an accredited institution.

Though admissions decisions are usually based on an applicant's undergraduate record, in some cases the applicant may be required to submit scores from the Graduate Management Admission Test (GMAT).

## MS, Labor Relations

A total of 30 graduate credit hours is required for completion of the master of science degree in labor relations. Of these, 21 credits (seven courses) are required courses and 9 credits (three courses) are approved concentration/elective courses. Two concentrations are offered: a Private Sector Track and a Public Sector Track.

There is no thesis option.

**Required Courses**

| | | |
|---|---|---|
| EC | 625 | Industrial Relations |
| EC | 627 | Economics of Labor Relations |
| EC | 687 | Collective Bargaining |
| MG | 637 | Management Process |
| P | 642 | Organizational Change and Development |
| PA | 611 | Research Methods in Public Administration |
| PA | 690 | Research Seminar |

Approved electives or concentration (three courses)

**Total credits: 30**

## Private Sector Track

*Three of the following:*

| | | |
|---|---|---|
| CO | 621 | Managerial Communication |
| E | 659 | Writing and Speaking for Professionals |
| EC | 679 | Industrial Relations Seminar |
| MG | 645 | Management of Human Resources |
| MG | 664 | Organizational Effectiveness |
| MG | 667 | Multicultural Issues in the Workplace |
| MG | 671 | Employment Law |

## Public Sector Track

*Three of the following:*

| | | |
|---|---|---|
| CO | 621 | Managerial Communication |
| E | 659 | Writing and Speaking for Professionals |
| MG | 667 | Multicultural Issues in the Workplace |
| PA | 620 | Personnel Administration and Collective Bargaining in the Public Sector |
| PA | 625 | Administrative Behavior |
| PA | 659 | Human Resource Planning in Health Care |
| SH | 602 | Safety Organization and Administration |

# Graduate Certificates

The College of Business offers the following graduate certificates designed as options for those having a baccalaureate degree, or a master's degree, who want to enroll in a part-time, short, coherent course of study at the graduate level. Those who may not yet be ready to commit themselves to a full-length graduate program, as well as those who already hold a graduate degree but want to pursue additional work in the same or another field, may find that a certificate provides the perfect alternative.

Students applying to the Graduate School to enter a certificate program must complete the Graduate School application form and submit official transcripts showing completion of the undergraduate/baccalaureate degree and two letters of recommendation.

See the Table of Contents for the Academic Policies section of the catalog for a complete description of the options, regulations, and requirements for completion of a graduate certificate.

## Accounting Certificate

**Advisor:** Robert E. Wnek, Professor, BSBA, Villanova University; JD, Widener University School of Law; LLM, Boston University School of Law; CPA

A certificate in accounting is recommended to students and professionals whose education already includes an accounting degree and who wish to pursue accounting at an advanced level without necessarily enrolling in the full graduate program. An accounting certificate is especially recommended to certified public accountants who wish to obtain continuing professional education credits in an academic environment.

**Any four of the following:**

| | | |
|---|---|---|
| A | 616 | Taxation for Management |
| A | 630 | Topics in Corporate Financial Reporting |
| A | 641 | Accounting Information Systems |
| A | 642 | Operational Auditing |
| A | 650 | Advanced Accounting Theory* |
| A | 652 | Auditing and Assurance Services Seminar |
| A | 654 | Financial Statements: Reporting and Analysis |
| A | 661 | Managerial Accounting Seminar |

Other courses may be substituted with consent of the advisor.

**Total credits:** 12

**Prerequisite is A 630 or two undergraduate intermediate accounting courses.*

## Business Management Certificate

**Advisor:** Gil Fried, Professor, JD, Ohio State University

This certificate is designed to develop students' conceptual knowledge and skills in formulating corporate strategy and in determining structural and resource requirements. The course focuses on concepts and processes useful in relation to general management and on functional responsibilities in coordinating and directing the organizational effort in our ever-changing economic environment. Prerequisites are required for some of the courses in the certificate; consult course descriptions elsewhere in this catalog.*

| | | |
|---|---|---|
| MG | 637 | Management Process |

*Plus three of the following:*

| | | |
|---|---|---|
| MG | 645 | Management of Human Resources |

| | |
|---|---|
| MG 655 | Corporate Governance and Business Strategy |
| MG 662 | Organizational Theory |
| MG 664 | Organizational Effectiveness |
| MG 670 | Selected Topics |

(with permission of the certificate advisor)

Other management courses may be permitted as substitutions with approval of the advisor.

**Total credits: 12**

**MPA students should complete 12 credits of the core curriculum in the MPA program, including PA 601 and PA 625, as the prerequisite for this certificate.*

## Finance Certificate

**Advisor:** Steven J. Shapiro, Professor, PhD, Georgetown University

The goal of the finance certificate is to prepare individuals for careers in the financial services sector as well as in modern corporate financial management. Certificate study stresses the understanding of the conceptual foundations of finance and the use of analytic techniques. Certificate candidates are required to meet the prerequisites for FI 601.

Students should contact the finance advisor as soon as possible to plan course selection.

| | |
|---|---|
| FI 601 | Financial Management |
| FI 602 | Finance Strategy and Valuation |

Plus two finance electives

**Total credits: 12**

## Health Care Management Certificate

**Advisor:** Charles N. Coleman, Assistant Professor, MPA, West Virginia University

This certificate will be useful for professionals and decision makers employed in the public, private, or nonprofit sectors of the health care field. Coursework will provide students with background and skills to enhance personal and professional development as well as the opportunity for organizational advancement.

| | |
|---|---|
| MG 640 | Management of Health Care Organizations |
| PA 641 | Financial Management of Health Care Organizations |
| PA 643 | Health and Institutional Planning |

*Plus one of the following:*

| | |
|---|---|
| MG 630 | Management Information Systems in Health Care |
| PA 642 | Health Care Delivery Systems |
| PA 644 | Administration of Programs and Services for the Aged |
| PA 645 | Health Care Economics and Finance |
| PA 646 | Organization and Management of Long-Term Care Facilities |
| PA 647 | Alternative Health Care Delivery Systems |
| PA 648 | Contemporary Issues in Health Care |
| PA 649 | History and Development of Health Care Institutions |
| PA 651 | Health Care Ethics |
| PA 652 | Introduction to Managed Care |
| PA 653 | Cost Containment in Health Care |
| PA 657 | Health Care Reimbursements |
| PA 659 | Human Resource Planning in Health Care |
| PA 662 | Recruitment and Retention of Health Care Professionals |
| PA 664 | Survey of Medical Group Management |
| PA 670 | Selected Topics |
| PS 635 | Law and Public Health |

**Total credits: 12**

The certificate in long-term health care, leading to eligibility for the State of Connecticut licensing examination in long-term care administration, is described below.

## Human Resources Management Certificate

**Advisor:** Gil Fried, Professor, JD, Ohio State University

This certificate is designed for the human resources professional or the individual in an allied field who aspires to increase his/her proficiency in

human resources management. The program provides an overview of the field and an opportunity to study various subfunctions (such as training, compensation and benefits, or industrial relations) in greater depth.

| | | |
|---|---|---|
| MG | 645 | Management of Human Resources |

*Plus three of the following:*

| | | |
|---|---|---|
| EC | 625 | Industrial Relations |
| MG | 627 | Human Resources and Financial Decision Making |
| EC | 679 | Industrial Relations Seminar |
| EC | 687 | Collective Bargaining |
| MG | 637 | Management Process |
| MG | 663 | Leadership and Team Building |
| MG | 664 | Organizational Effectiveness |
| MG | 665 | Compensation Administration |
| MG | 667 | Multicultural Issues in the Workplace |
| MG | 678 | Personnel Management Seminar |
| MG | 671 | Employment Law |
| P | 619 | Organizational Behavior |
| P | 628 | The Interview |
| P | 641 | Personnel Development and Training |
| P | 642 | Organizational Change and Development |
| P | 643 | The Psychology of Conflict Management I |
| PA | 620 | Personnel Administration and Collective Bargaining in the Public Sector |
| SH | 602 | Safety Organization and Administration |

Selection of electives must have the approval of the program advisor.

**Total credits: 12**

## International Business Certificate

**Advisor:** Ben B. Judd, Professor, PhD, University of Texas at Arlington

This certificate is designed to prepare managers to deal with current problems and methods of analysis related to international business. The program includes basic techniques and skills, such as adapting to new political and cultural environments, which are not normally covered by traditional courses.

| | | |
|---|---|---|
| IB | 644 | Managing in Global Markets |

*Plus three of the following:*

| | | |
|---|---|---|
| EC | 641 | International Economics |
| | | *or* |
| FI | 632 | International Financial Management |
| IB | 645 | Comparative International Business Environments |
| IB | 650 | International Business Negotiating |
| IB | 651 | International Marketing |
| IB | 652 | Multinational Business Management |
| IB | 660 | East and Southeast Asian Business Systems |
| IB | 670 | Selected Topics |
| IB | 693 | Internship |
| MK | 639 | Marketing Research and Information Systems |

**Total credits: 12**

## Long-Term Health Care Certificate

**Advisor:** Charles N. Coleman, Assistant Professor, MPA, West Virginia University

This certificate is approved by the Deparrment of Health Services, State of Connecticut, as a course of study in long-term health care. Students who complete this 12-credit course of study are eligible to take the state licensing examination for long-term care administration, preparing individuals for participation in this area of expanding opportunities for health care practitioners.

The Long-Term Care Certificate is available in two options as shown below. Please contact the Program Coordinator prior to selecting an option as the State of Connecticut has different requirements for each option.

**Option I:**

| | | |
|---|---|---|
| PA | 641 | Financial Management of Health Care Organizations |
| PA | 646 | Organization and Management of Long-Term Care Facilities |
| PA | 681 | Long-Term Health Care Internship I |
| PA | 682 | Long-Term Health Care Internship II |

**Total credits: 12**

Option II:

| | | |
|---|---|---|
| PA | 641 | Financial Management of Health Care Organizations |
| PA | 646 | Organization and Management of Long-Term Care Facilities |
| PA | 683 | Long-Term Health Care Internship |

One three-credit health care elective

**Total credits: 12**

## Management of Sports Industries Certificate

**Advisor:** Gil B. Fried, Professor, JD, Ohio State University

This certificate is designed for those contemplating a career in some segment of the sports industry or for those already working in the field and interested in advancing their careers. Courses are designed to enhance knowledge and skills in sports marketing and public relations as well as the management of professional and school-based sports, facilities, and fitness and wellness programs.

MG 610 The Sports Industry

*Plus three of the following:*

| | |
|---|---|
| MG 611 | Sports Industry Marketing, Promotion, and Public Relations |
| MG 612 | Sports Law |
| MG 613 | Sports Facility Management |
| MG 617 | Applied Fiscal Management for Sports and Facility Managers |
| MG 618 | College Sports Administration |
| MG 694 | Internship |

Other courses may be substituted with the consent of the certificate advisor.

**Total credits: 12**

## Marketing Certificate

**Advisor:** Ben B. Judd, Professor, PhD, University of Texas at Arlington

The certificate in marketing allows the student to acquire a deeper understanding of marketing phenomena and to develop analytic skills. Special emphasis is given to the development of content knowledge and skills necessary for operating managers of the marketing function. It is suggested that MK 641 Marketing Management and MK 639 Marketing Research and Information Systems, if taken, be preceded by other courses in the program. Note that MK 609 and MG 637 are prerequisites for the certificate. Also note that QA 604 is a prerequisite for QA 675.

MK 641 Marketing Management

*Plus three of the following:*

| | |
|---|---|
| MK 616 | Buyer Behavior |
| MK 632 | Nonprofit and Services Marketing |
| MK 638 | Competitive Marketing Strategy |
| MK 639 | Marketing Research and Information Systems |
| MK 643 | Product Management |
| MK 645 | Distribution Strategy |
| QA 675 | Computer-Aided Multivariate Analysis |

**Total credits: 12**

## Public Administration Certificate

**Advisor:** Charles N. Coleman, Assistant Professor, MPA, West Virginia University

This certificate is designed to provide training at the graduate level for people in public service. Coursework focuses on the analytic, quantitative, administrative, and managerial knowledge and skills needed to meet the complex problems and responsibilities of government agencies and organizations.

| | | |
|---|---|---|
| PA | 601 | Principles of Public Administration |
| PA | 602 | Public Policy Formulation and Implementation |
| PA | 620 | Personnel Administration and Collective Bargaining in the Public Sector |
| PA | 630 | Fiscal Management for Local Government |
| | | *or* |
| PA | 632 | Public Finance and Budgeting |

**Total credits: 12**

## Public Management Certificate

**Advisor:** Charles N. Coleman, Assistant Professor, M.P.A., West Virginia University

This certificate is designed to provide a broad overview of the most current thinking in public management. Courses emphasize conceptual and analytic skill building. Students may select either a survey of the field or public personnel management.

**Option I: Survey of the Field**

Any four of the following:

| | | |
|---|---|---|
| EC | 665 | Urban and Regional Economic Development |
| PA | 611 | Research Methods in Public Administration |
| PA | 620 | Personnel Administration and Collective Bargaining in the Public Sector |
| PA | 625 | Administrative Behavior |
| PA | 630 | Fiscal Management for Local Government |
| PA | 632 | Public Finance and Budgeting |
| PS | 608 | The Legislative Process |

**Total credits:** 12

**Option II: Public Personnel Management**

| | | |
|---|---|---|
| EC | 625 | Industrial Relations |
| PA | 620 | Personnel Administration and Collective Bargaining in the Public Sector |
| PA | 625 | Administrative Behavior |

*Plus one of the following:*

| | | |
|---|---|---|
| MG | 645 | Management of Human Resources |
| MG | 665 | Compensation Administration |
| P | 643 | The Psychology of Conflict Management I |
| P | 646 | The Psychology of Conflict Management II |
| SH | 602 | Safety Organization and Administration |

**Total credits:** 12

## Taxation Certificate

**Advisor:** Robert E. Wnek, Professor, BSBA, Villanova University; JD, Widener University School of Law; LLM, Boston University School of Law; CPA

This certificate is for accountants and practitioners who wish to improve or update their tax skills, including practicing CPAs needing continuing education credits and others seeking to expand their tax backgrounds.

Any four of the following:

| | | |
|---|---|---|
| A | 601 | Federal Income Taxation I |
| A | 602 | Federal Income Taxation II |
| A | 604 | Taxation of Business Entities |
| A | 605 | Partnership and Limited Liability Company Income Taxation |
| A | 606 | Corporate Income Taxation |
| A | 607 | Qualified Plans |
| A | 608 | Taxation of Estates, Gifts, and Trusts |
| A | 609 | Federal Tax Practice and Procedure |
| A | 610 | International Taxation |
| A | 611 | State and Local Taxation |

Other courses may be substituted with consent of the advisor.

**Total credits:** 12

## Telecommunication Management Certificate

**Advisor:** Jerry L. Allen, Professor, PhD, Southern Illinois University at Carbondale

This certificate is designed to prepare telecommunication managers to deal with current problems and methods of analysis pertinent to this fast-changing field and to end users, suppliers, and common carriers of telecommunication services and facilities.

| | | |
|---|---|---|
| CO | 640 | Communication Technologies* |
| CO | 641 | Competition and Regulation in Telecommunication |
| CO | 642 | Management of Telecommunication Organizations |
| CO | 643 | Telecommunication Policy and Strategy |

**Total credits:** 12

**Students who have had the equivalent of CO 640, through either work experience or educational courses given by a common carrier, may substitute another course with the consent of the advisor.*

# TAGLIATELA COLLEGE OF ENGINEERING

Barry J. Farbrother, BSc (Hons), PhD, CEng, Dean

Michael A. Collura, BS, MS, PhD, PE, Associate Dean

M. Ali Montazer, BS, MS, PhD, Associate Dean

Few professions can match engineering for challenge and excitement, and the changing face of engineering will shape the world in the twenty-first century—a world of exotic materials, new sources of energy, staggering telecommunications and computing capabilities, cybernetic factories, and public works needed by society. Exciting developments are occurring at the interface between the physical and life sciences such as tissue engineering. Engineers and scientists are working to realize benefits in the micro miniature world of nanotechnology. The mission of the Tagliatela College of Engineering is to prepare individuals for professional practice in diverse areas of engineering, chemistry, computer science, and information technology. In addition, the College prepares individuals for lifelong education in their professional careers and for such formal post-baccalaureate education as their inclination and professional growth require. Master of Science degree programs are offered through the Graduate School—in computer science, electrical engineering, environmental engineering, industrial engineering, mechanical engineering, and executive engineering management (EMSEM). A dual degree program combines the master's in business administration (MBA) with the Master of Science in industrial engineering. Graduate certificates are offered in civil engineering design, computer applications, computer programming, computing, Lean-Six Sigma, logistics, network administration, and quality engineering. At the undergraduate level, the College offers bachelor's degrees in chemistry, information technology, and general engineering along with its five bachelor's degrees in chemical, civil, computer, electrical, and mechanical engineering, which are accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (EAC/ABET). Also offered is a bachelor's degree program in computer science, which is accredited by the Computing Accreditation Commission of the Accreditation Board for Engineering and Technology (CAC/ABET). A new BS degree in system engineering will be offered commencing fall 2007.

## Computer Science

Coordinators

**Graduate Advisor:** Barun Chandra, Associate Professor, PhD, University of Chicago

**Graduate Admissions Coordinator:** Tahany Fergany, Professor, PhD, University of Connecticut

This program provides advanced professional training in computer science and gives students a diversity of experience and subject matter through its distribution, concentration, elective, and project requirements. Its broad scope recognizes the continuing development of computing disciplines and applications and allows students to prepare for this. The program can be used to enter, or advance in, the computing profession or an allied field, along a variety of career paths. It may also be used to prepare for further graduate study.

### Admission Policy

This program is designed to accommodate students with no prior programming experience as well as those who already hold an undergraduate degree in computer science. All applicants will be expected to demonstrate that they have completed a baccalaureate degree and a course in college algebra prior to enrolling. Submission of GRE scores is not required.

## MS, Computer Science

Students with an adequate background in computer science will complete 30 credit hours of coursework consisting of 9 credits of distribution courses, 9 of concentration courses, and 12 of elective courses. In addition, within these 30 credit hours of coursework, students must satisfy a project requirement and a programming language requirement. Students with a background other than computer science may need to complete up to 18 additional credit hours of core courses. Any of the six required core courses may be waived on the basis of appropriate undergraduate or graduate courses, subject to the approval of the Computer Science Graduate Admissions Coordinator. Students who seek a waiver must submit a petition form along with supporting documentation to the Coordinator before or during the student's first trimester. Only courses with grades of "B-" or better may be used for waiver purposes. Students are expected to complete the core courses soon after joining the program; until all core courses have been either waived or successfully completed, a student is not allowed to enroll in more than three non-core courses. Required (non-core) courses cannot be waived, but transfer credit and substitutions may apply. However, this is subject to the university's 30-credit residency requirement, so students have to complete a minimum of 30 credit hours at the University of New Haven. The curriculum is being updated constantly. The most up-to-date version of the program can be obtained from either one of the graduate coordinators.

### Placement Policy

Students will be placed in the programming sequence by the graduate coordinators. Those with sufficient prior experience in C programming might start in CS 610 or CS 620. A beginning programmer must start with CS 604, which is a prerequisite to the core and can be counted as the student's single free elective. Students who feel that they have the programming skills to not take CS 604 are required to take a placement exam. Additionally, new students should take CS 630 and CS 640 at the start of the program since these are core courses with no prerequisites.

Before enrolling in any course, students must make sure that they meet all the prerequisites for that course (as specified in the course description), either by courses taken as part of the program or by work done outside the program.

Normally, a grade of "B-" or better may be used for prerequisite courses to meet our expectations for mastery of the prerequisite subject. Credit may be denied for a course taken without first satisfying all of its prerequisites unless prior written approval has been obtained from the graduate advisor.

**Core Courses (18 credits, waivable)**

| | | |
|---|---|---|
| CS | 610 | Intermediate Programming/C |
| CS | 620 | Data Structures |
| CS | 630 | Introduction to Computing Theory |
| CS | 632 | Algorithm Design and Analysis |
| CS | 640 | Computer Organization |
| CS | 644 | Operating Systems |

**Required Courses (not waivable)**

**Distribution Courses (9 credits)**

Each student will select one course from each of the following three categories:

**Software Design Methodology**
**Distribution Courses** (choose one)

| | | |
|---|---|---|
| CS | 623 | Rapid Software Development/ Visual Basic |
| CS | 626 | Object-Oriented Principles and Practice/C++ |
| CS | 628 | Object-Oriented Analysis and Design |

**Theory and Analysis Distribution Courses**
(choose one)

| | | |
|---|---|---|
| CS | 633 | Topics in Algorithms |
| CS | 634 | Cryptography and Data Security |
| CS | 636 | Structure of Programming Languages |
| CS | 660 | Artificial Intelligence |

**Computer Systems Distribution Courses**
(choose one)

| | | |
|---|---|---|
| CS | 616 | Assembly Language |
| CS | 640B | Parallel Computer Architectures |
| CS | 642 | Computer Networks and Data Communication |
| CS | 644B | Distributed Operating Systems |
| CS | 647 | Systems Programming |

**Concentration Courses and Project Requirement**
(9 credits)

There are five possible concentration areas. Each student must pick one of these and complete three courses in that concentration. Some courses belong to the lists of both distribution and concentration courses, but one course cannot be used to satisfy both requirements.

There are two different ways to satisfy the project requirement: (1) by extending and completing a significant project begun within a regular concentration course or (2) by completing a separate CS 690 Project course. In either case, the project content must be in the student's concentration area.

If a student is doing a project within a course, no additional tuition payment is due for that project, and no additional credit is given for it. The instructor for the project course must agree, at the beginning of the trimester, to accept the project in fulfillment of degree requirements. Suggested courses for this purpose include CS 617, CS 622B, CS 623, CS 626, CS 627, CS 628, CS 640B, CS 642, CS 644B, CS 647, CS 650, CS 655, CS 657, CS 660, and CS 665.

If a student is doing the CS 690 Project course, it will count as a concentration course in addition to satisfying the project requirement. Students who plan to do the CS 690 Project must find a project advisor, prepare a project proposal, and obtain written approval for the project prior to registration.

In order to do a CS 690 project, the student's QPR must be 3.3 or higher.

## Concentration Course Areas

**Advanced Applications Concentration**

| | | |
|---|---|---|
| CS | 650 | Computer Graphics |
| CS | 660 | Artificial Intelligence |
| CS | 663 | Mobile Robotics |
| CS | 665 | Digital Image Processing |
| CS | 690 | Project |
| IE | 681 | System Simulation |
| IE | 682 | Advanced System Simulation |

**Computer Systems Concentration**

| | | |
|---|---|---|
| CS | 616 | Assembly Language |
| CS | 640B | Parallel Computer Architectures |
| CS | 642 | Computer Networks and Data Communication |
| CS | 644B | Distributed Operating Systems |
| CS | 647 | Systems Programming |
| CS | 690 | Project |
| EE | 658 | Embedded Applications |

**Database and Information Systems Concentration**

| | | |
|---|---|---|
| CS | 622 | Database Systems |
| CS | 622B | Advanced Database Systems |
| CS | 623 | Rapid Software Development/Visual Basic |
| CS | 625 | Software Project Management |
| CS | 627 | Distributed Database Systems |
| CS | 645 | Network Administration |
| CS | 655 | Internet Applications with Java |
| CS | 690 | Project |

**Network Systems Concentration**

| | | |
|---|---|---|
| CS | 634 | Cryptography and Data Security |
| CS | 642 | Computer Networks and Data Communication |
| CS | 645 | Network Administration |
| CS | 646 | Introduction to Computer Security |
| CS | 649 | Network Analysis |
| CS | 655 | Internet Applications with Java |
| CS | 690 | Project |

**Software Development Concentration**

| | | |
|---|---|---|
| CS | 617 | Java Programming |
| CS | 623 | Rapid Software Development/Visual Basic |
| CS | 625 | Software Project Management |
| CS | 626 | Object-Oriented Principles and Practice/C++ |
| CS | 628 | Object-Oriented Analysis and Design |
| CS | 690 | Project |

**Electives (12 credits)**

At least three of the elective courses must be chosen from the list of Restricted Elective courses. The fourth elective course may be either a Restricted or a Free Elective.

### Restricted Electives

The Restricted Elective courses include all the Distribution courses and all the Concentration courses. Some CS 670 Selected Topics courses may also be designated as Restricted Electives on a case-by-case basis.

Important Note: The Core courses are not Restricted Electives. In addition, CS 601, CS 604, and Internships are not Restricted Electives, but they may be counted as a student's one Free Elective.

**The following are also Restricted Electives:**

| | | |
|---|---|---|
| IE | 601 | Introduction to Operations Research/ Management Science |
| IE | 607 | Probability Theory |
| IE | 609 | Descriptive and Inferential Statistics |
| IE | 621 | Linear Programming |
| IE | 622 | Queuing Theory |
| IE | 623 | Decision Analysis |
| IE | 624 | Quality Analysis |
| IE | 681 | System Simulation |
| IE | 682 | Advanced System Simulation |
| IE | 685 | Theory of Optimization |
| IE | 688 | Design of Experiments |
| M | 611 | Matrix Theory and Its Applications |
| M | 615 | Linear Mathematics and Combinatorics |
| M | 620 | Numerical Analysis |
| M | 624 | Applied Mathematics |

### Free Elective

A Free Elective may be any CS graduate course or any relevant course listed by Criminal Justice/Forensic Science, Mathematics, Molecular Biology, or a department in the Tagliatela College of Engineering or in the College of Business. A student who wants to take a Free Elective course other than those indicated here must obtain prior written approval from the graduate advisor.

### Programming Language Requirement

Each student must demonstrate mastery of a programming language other than C. This may be accomplished in one of two ways: (1) by completing, within the above program requirements, at least one of the courses in the Programming Languages group listed below or (2) by submitting prior work (subject to the approval of the graduate advisor) which demonstrates that the student knows a programming language other than C.

### Programming Language Courses

| | | |
|---|---|---|
| CS | 616 | Assembly Language |
| CS | 617 | Java Programming |
| CS | 623 | Rapid Software Development/Visual Basic |
| CS | 626 | Object-Oriented Principles and Practice/C++ |

**Total credits: 48**

# Electrical Engineering

**Coordinator:** Bouzid Aliane, Professor, PhD, Polytechnic Institute of New York

The Department of Electrical and Computer Engineering's program leading to the degree of Master of Science in Electrical Engineering (MSEE) is designed to provide students and practicing engineers alike with the technical background for analysis, design, and development of, or research on, electrical and computer engineering systems in a spectrum of professional skills. It enables students to expand and deepen their knowledge beyond the bac-

calaureate degree and gives them the ability to adapt to ever-changing technological developments. Areas of research expertise and study at the graduate level include communications, control, digital signal processing, digital system design and simulation, microprocessor systems, optical sensors, embedded computing, computer engineering, computer architecture, computer networks, fuzzy systems, VLSI design, and many other relevant subareas of electrical and computer engineering.

### Admission Policy

To be eligible for admission, a student must have an undergraduate degree from a program accredited by the Accreditation Board for Engineering and Technology (ABET), or its equivalent, showing a strong record with a "B" average or better. In some instances, students who do not meet the above criteria may be considered for admission on the basis of evaluation of their current status, goals, and potential for success in the program. Such students may be admitted subject to making up deficiencies in their undergraduate studies.

Applicants are urged to submit Graduate Record Examination (GRE) scores to provide additional information for the admissions decision. Two letters of recommendation (professional or academic) from individuals familiar with the applicant's potential for graduate study are also required as well as official transcripts of all undergraduate work completed.

A student need not be admitted to the program in order to enroll in an individual course; however, approval should be obtained from the course instructor. Courses completed prior to achieving official admission may be applied to the degree requirements with the approval of the program coordinator.

### Transfer Credit

The transfer of graduate credit from other institutions may be permitted with the approval of the program coordinator and subject to Graduate School policy on transfer credit detailed elsewhere in this catalog.

### Research Project/Thesis Requirement

Students may elect to undertake a thesis for partial fulfillment (six or nine credits) of the requirements for the degree provided that they have at least a 3.2 QPR or a strong endorsement from their advisor. The thesis must be a well-written document on an original topic of research or development in electrical and computer engineering. It must show the ability to organize materials in a clear and original manner and to present well-reasoned conclusions. The student must write a master's thesis and successfully defend it at a final oral presentation. Thesis preparation and submission must comply with Graduate School policy on theses as well as with specific departmental requirements. Detailed information concerning these requirements is available from the department office. Students who do not elect to undertake thesis work must complete a research project (EE 690) within the elective portion of the program. A written final report and an oral presentation are required. The oral presentation is intended to verify that the research represents the student's own contribution to knowledge and to test the student's understanding of research. One copy of the final draft must be submitted to the graduate coordinator.

## MS, Electrical Engineering

A total of 36 graduate credit hours beyond the baccalaureate degree must be completed to earn the Master of Science in Electrical Engineering. The degree is structured into two options: electrical engineering and computer engineering. Candidates must complete the specific requirements for the option they select. Students may be required to take additional courses if, in the advisor's opinion, their background is not appropriate for the curriculum or option selected.

### Option I: Electrical Engineering

This option is designed for students who wish to focus their study in communication systems, control systems, digital signal processing, optical sensors, or fuzzy systems. In addition to the four required courses, eight electives are chosen in consultation with the student's advisor or program coordinator.

Required Courses

One mathematics course*

*Plus the following:*

| | | |
|---|---|---|
| EE | 603 | Discrete and Continuous Systems I |
| EE | 604 | Discrete and Continuous Systems II |
| EE | 650 | Random Signal Analysis |
| Approved | | Electives (eight courses) |

Total credits: 36

**Selection of the required mathematics course must be made with the approval of the program coordinator. M 611 Matrix Theory and Its Applications is strongly recommended. Students may not take M 610 or M 616 for credit in this degree option.*

Elective Courses

| | | |
|---|---|---|
| CS | 640B | Parallel Computer Architecture |
| CS | 650 | Computer Graphics |
| CS | 664 | Neural Networks |
| EE | 605 | Computer Control Systems |
| EE | 606 | Robot Control |
| EE | 607 | Adaptive Control |
| EE | 620 | Fuzzy Logic and Control |
| EE | 630/631 | Electronic Instrumentation I/II |
| EE | 634/635 | Digital Signal Processing I/II |
| EE | 637/638 | Power Systems Engineering I/II |
| EE | 639 | Electric Power Distribution |
| EE | 645 | Introduction to Communication Systems |
| EE | 646/647 | Digital Communications I/II |
| EE | 652 | Design of Digital Filters |
| EE | 658 | Embedded Applications |
| EE | 670 | Selected Topics |
| EE | 680 | Fiber Optic Communications |
| EE | 681 | Lightwave Technology |
| EE | 685 | Optimization of Engineering Systems |
| EE | 690 | Research Project |
| EE | 695 | Independent Study |
| EE | 697/698/699 | Thesis I, II, and III |
| M | 611 | Matrix Theory and Its Applications |
| M | 615 | Linear Mathematics and Combinatorics |

With the approval of the program coordinator or the academic advisor, two of the elective courses may be taken in other disciplines of mathematics, engineering, physics, or computer science. Other EE courses may be taken as elective courses with the approval of the program coordinator or academic advisor.

## Option II: Computer Engineering

This option is designed primarily to serve those students who wish to obtain advanced knowledge in the applications of electrical engineering principles to the design of computer-based systems. Working electrical engineers with BSEE degrees find an increasing amount of their professional time devoted to projects related to computer engineering. Almost any system or instrument now contains an embedded computer along with its own operating system and software, which in many cases are written and maintained by electrical engineers. The computer engineering option seeks to help these engineers cope with this shift by offering more graduate work in the computer engineering area under the MSEE degree program.

Required Courses*

| | | |
|---|---|---|
| CS | 620 | Data Structures |
| CS | 644 | Operating Systems |
| EE | 610 | Networking I |
| EE | 656 | Hardware Description Language |
| EE | 657 | VLSI Design |
| EE | 658 | Embedded Applications |
| EE | 682 | Computer Architecture |
| EE | 690 | Research Project** |
| | | *or* |
| Thesis EE 697 and EE 698 | | |

Elective Courses***

Four electives from ECE or CS Department

Total credits: 36

**Required courses may be replaced by other courses if a student can demonstrate equivalent knowledge.*

***Students who elect to write a thesis will register for EE 697 and 698 Thesis I and II in lieu of EE 690 and one of the elective courses in the program.*

****Elective courses must be taken with the approval of the program coordinator or the academic advisor. Elective courses may be taken from other departments with the approval of the MSEE coordinator or the academic advisor. CS 610 or any other introductory course in C cannot be used as an elective. Students with deficiency in this area must take CS 610 in addition to the regular coursework for the computer engineering option in the MSEE program.*

Elective Courses

| | | |
|---|---|---|
| CS | 640B | Parallel Computer Architecture |
| CS | 650 | Computer Graphics |
| CS | 664 | Neural Networks |
| EE | 603 | Discrete and Continuous Systems I |
| EE | 604 | Discrete and Continuous Systems II |
| EE | 605 | Computer Controlled Systems |
| EE | 606 | Robot Control |
| EE | 607 | Adaptive Control |
| EE | 620 | Fuzzy Logic and Control |
| EE | 630/631 | Electronic Instrumentation I/II |
| EE | 634/635 | Digital Signal Processing I/II |
| EE | 637/638 | Power Systems Engineering I/II |
| EE | 639 | Electric Power Distribution |
| EE | 645 | Introduction to Communication Systems |
| EE | 646/647 | Digital Communications I/II |
| EE | 650 | Random Signal Analysis |
| EE | 652 | Design of Digital Filters |
| EE | 658 | Embedded Applications |
| EE | 670 | Selected Topics |
| EE | 680 | Fiber Optic Communications |
| EE | 681 | Lightwave Technology |
| EE | 685 | Optimization of Engineering Systems |
| EE | 690 | Research Project |
| EE | 695 | Independent Study |
| EE | 697/698/699 | Thesis I, II, and III |
| M | 611 | Matrix Theory and Its Applications |
| M | 615 | Linear Mathematics and Combinatorics |

With the approval of the program coordinator or academic advisor, students may select other courses in mathematics, engineering, physics, or computer science.

# Environmental Engineering

**Coordinator:** Agamemnon D. Koutsospyros, Professor, PhD, Polytechnic University

The program is designed to prepare engineers for successful and dynamic careers in the continuously expanding field of environmental engineering. Due to its interdisciplinary nature, the program allows students to take a combination of courses in related areas.

In a rapidly changing and increasingly interconnected world, pollution problems have aroused increased individual and public awareness. Environmental engineering has expanded rapidly to include areas such as water and air pollution, groundwater contamination, solid and hazardous waste management, industrial waste treatment, pollution prevention, and sustainable development. There is a wide array of employment opportunities for environmental engineers in federal, state, and local government as well as in the industrial and private sectors.

The program provides the advanced educational skills necessary to meet the ever-changing needs and challenges of the field. It offers vigorous, professionally oriented courses, case studies, new technology, and research developments.

## Admission Policy

Candidates for admission to the master's program are expected to have a grade point average of 3.0 or better (on a 4.0 scale) in their undergraduate major coursework and to hold a baccalaureate degree in civil or environmental engineering from a program accredited by the Accreditation Board for Engineering and Technology (ABET) or from a program with a demonstrated equivalent accreditation. Applications from candidates with an ABET-accredited or equivalent engineering degree in an area of study outside civil/environmental engineering and with a minimum undergraduate grade point average of 3.0 will be considered. However, such students may be required to complete certain undergraduate civil/environmental engineering courses as a condition of acceptance. Applicants are urged to submit scores from the Graduate Record Examination (GRE) general test to aid in the evaluation process.

In general, engineering studenrs who do not meet the above criteria and students with non-engineering undergraduate degrees will not be considered candidates for admission. However, a potential candidate who does not meet the admission criteria may, in consultation with and with the approval of the department chairperson, pursue a program of study

which may include a sequence of undergraduate courses to satisfy deficiencies. Only after the completion of such a program of study will the student be considered for admission to the graduate program in environmental engineering.

## MS, Environmental Engineering

A total of 39 credit hours, 12 three-credit courses plus a three-credit research project, must be completed to earn the master of science degree in environmental engineering. Nine courses, exclusive of the research project, must be selected from courses designated as environmental engineering. Three courses may be selected from outside the environmental engineering department. Enrollment in non-environmental engineering courses, other than those listed below as approved non-environmental engineering electives, requires approval of the program coordinator. Transfer credit from other institutions will be permitted subject to Graduate School policy on transfer credit detailed elsewhere in this catalog.

**Required Courses**

Approved Environmental Engineering Courses (9 courses)
CE 690 Research Project
Approved Electives (3 courses)

**Total credits: 39**

## Concentrations in Environmental Engineering

Students may elect to pursue a sequence of courses in one of three areas of concentration, or they may tailor a program of study to meet specific individual needs or objectives within the constraints of the program. At the time of admission to the program, each student is assigned a faculty advisor who will assist the student in formulating a program of study and identifying an appropriate research project.

## Concentration in Industrial and Hazardous Wastes

**Concentration Advisor:** Agamemnon D. Koutsospyros, Professor, PhD, Polytechnic University

**Suggested Courses**

| | |
|---|---|
| CE 601 | Physical-Chemical Treatment of Aqueous Wastes |
| CE 602 | Biological Treatment of Aqueous Wastes |
| CE 603 | Contaminant Fate and Transport in the Environment |
| CE 605 | Solid Waste Management |
| CE 606 | Environmental Law and Legislation |
| CE 610 | Pollution Prevention Management Technologies |
| CE 613 | Industrial Wastewater Control |
| CE 618 | Hazardous Waste Treatment |
| CE 661 | Air Pollution Fundamentals |
| CE 690 | Research Project |
| CM 622 | Air Pollution Control |

Approved Electives (three courses)

**Total credits: 39**

## Concentration in Water and Wastewater Treatment

**Concentration Advisor:** Agamemnon D. Koutsospyros, Professor, PhD, Polytechnic University

**Suggested Courses**

| | |
|---|---|
| CE 601 | Physical-Chemical Treatment of Aqueous Wastes |
| CE 602 | Biological Treatment of Aqueous Wastes |
| CE 603 | Contaminant Fate and Transport in the Environment |
| CE 606 | Environmental Law and Legislation |
| CE 610 | Pollution Prevention Management Technologies |
| CE 612 | Advanced Wastewater Treatment |
| CE 613 | Industrial Wastewater Control |
| CE 617 | Wastewater Residuals Management |

CE 690 Research Project
CH 601 Environmental Chemistry
Approved Electives (three courses)
**Total credits: 39**

## Concentration in Water Resources

Concentration Advisor: Jean Nocito-Gobel, Assistant Professor, PhD, University of Massachusetts

**Suggested Courses**

CE 603 Contaminant Fate and Transport in the Environment
CE 606 Environmental Law and Legislation
CE 614 Surface Water Quality Management
CE 615 Groundwater Hydrology
CE 616 Contaminant Hydrology
CE 620 Engineering Hydrology
CE 621 Advanced Hydrology
CE 623 Open Channel Hydraulics
CE 624 Computer Applications in Hydrology/Hydraulics
CE 690 Research Project
Approved Electives (three courses)
**Total credits: 39**

## Non-Environmental Engineering Electives*

E 659 Writing and Speaking for Professionals
EN 600 Environmental Geoscience
EN 602 Environmental Effects of Pollutants
EN 607 Environmental Reports and Impact Assessment
EN 618 Hazardous Materials Management
EN 640 Introduction to Geographical Information Systems
EN 641 Geographical Information System Techniques and Applications I
EN 642 Geographical Information System Techniques and Applications II
M 620 Numerical Analysis

**Other courses may be taken as electives with the written approval of the program coordinator.*

# Executive Master of Science in Engineering Management (EMSEM)

**Coordinator:** Barry J. Farbrother, Professor and Dean, Tagliatela College of Engineering, PhD, University of Hertfordshire, England

This program provides technical professionals with the knowledge and skills they need to be successful today. Created specifically for those directly and indirectly involved in managing technology or engineering, the program integrates courses on the latest technical developments with business-related studies such as marketing and accounting. Taught in a cohort format by exceptional leaders in their fields, EMSEM is designed for busy adults and is the only graduate program of its kind in Connecticut. The program includes advanced learning in quality assurance, resource use optimization, modern production scheduling and control, supply chain management, and system simulation and project management. Additional topics include organizational development, financial management, marketing management, and leadership. The experienced engineering manager, typically not holding a graduate degree, requires state-of-the-art educational exposure to information directly related to his or her technical work environment that goes beyond the traditional MBA. EMSEM is specifically designed to provide this.

## Admission Policy

Application for admission may be made to the UNH Graduate School. Qualified applicants should hold a bachelor's degree from an accredited institution, or the equivalent. Five or more years' experience in a supervisory role in engineering, technical staff support, engineering or systems management, project management, systems engineering, manufacturing, logistics, industrial engineering, military operations, or quality assurance is viewed as a minimal requirement for admission. An applicant should be sponsored or nominated by his/her employer. Individuals with unique or extraordinary qualifica-

tions and a bona fide reason to enroll in the program are encouraged to apply and to present their cases for admission. The Industrial Engineering faculty, in consultation with the Graduate School and the dean of the Tagliatela College of Engineering, makes final decisions on admission.

Applicants to the program must be suitably qualified for both the EMSEM courses (EXIE) and the five Executive MBA courses (EXID). In cases where deficiencies exist that are likely to impede success in a given course, students may be required to seek prerequisite education and/or meet certain academic conditions before enrollment in that course is permitted. The nature of an executive program requires that all participants, even if drawn from highly diverse backgrounds and occupations, share common skills and abilities that permit teamwork and successful learning in any given module.

## Executive MS, Engineering Management

The EMSEM program consists of 18 modules scheduled into consecutive academic years. The modules are sequenced for prerequisite purposes, and students are expected to follow the entire sequence with their entering class. Nine modules will be scheduled each academic year, each module running for five consecutive weeks on a given weekday for six hours, usually from 2:30 - 8:30 PM. An EMSEM class will generally meet on the same weekday afternoon for the entire two-year program period.

A research paper is required, and in the final module it is presented to the class and properly defended. For program completion, all papers must receive approval by the EMSEM program coordinator or academic advisor.

**Modules**

| | |
|---|---|
| EXIE 901 | Engineering Management Concepts |
| EXIE 902 | Managing Uncertainty |
| EXIE 903 | Statistics for Quality and Engineering Management |
| EXIE 957 | Organizational Change and Development |
| EXIE 914 | Achieving Optimal Operations |
| EXID912 | Financial Accounting |
| EXIE 926 | Constraint Assessment |
| EXIE 930 | Project Management |
| EXIE 948 | Queuing Theory and Applications |
| EXIE 950 | Simulation of Processing Systems |
| EXID921 | Executive Management and Leadership |
| EXIE 940 | Supply Chain Management |
| EXID924 | Financial Management I |
| EXIE 960 | E-Solutions in Engineering Management |
| EXID930 | Marketing Practice |
| EXIE 956 | Managing Quality Assurance |
| EXIE 970 | Current Topics in Engineering Management |
| EXIE 999 | Research Topic |

**Total credits: 54**

# Industrial Engineering

**Coordinator:** Alexis N. Sommers, Professor, PhD, Purdue University

The program is intended to meet the needs of professionally employed engineers working in an environment where cost effectiveness, high productivity, and effective use of resources are crucial. Designed to give an advanced level of training beyond the baccalaureate, sufficient to prepare for a leadership role in industry, the program centers on a core sequence required of all students. It contains courses in analysis and design of common interest to all industrial engineers of advanced professional standing. (See the notes which follow regarding waivers related to these core courses.) Students complete the program by choosing elective courses in operations research, human factors, manufacturing engineering, computer science, or other areas particularly suited to their professional interests and needs. Once the student and the student's advisor have agreed on these electives, they shall become part of the student's program of study. All subsequent changes in electives must be made with the advisor's advance written consent.

### Admission Policy

Candidates for admission are expected to hold an undergraduate degree in engineering from a program accredited by the Accreditation Board for Engineering and Technology, or demonstrated equivalent. In some cases, an applicant with a degree in a related field may be considered for admission. Students entering the program are expected to be competent in mathematics through calculus. Those with insufficient mathematics background will be required to take approved mathematics courses (e.g., M 610 Fundamentals of Calculus) outside/in addition to the program requirements. Applicants with degrees in fields other than industrial engineering may be required to take other graduate courses that serve as appropriate prerequisites.

Though admission decisions are based primarily on an applicant's undergraduate record, the promise of academic success is the essential factor.

### MSIE

The program consists of 45 credit hours. The transfer of credit from other institutions will be permitted subject to Graduate School policy on transfer credit detailed elsewhere in this catalog. Required courses may be waived on the basis of undergraduate courses taken at accredited institutions. All waivers must be approved in writing by the department of industrial engineering and are contingent upon subsequent academic performance. In some cases, the program coordinator may permit substitution of relevant courses in place of the required courses.

### Research Project/Thesis Requirement

All students in the program will complete a thesis or an appropriate special project which will partially fulfill the elective requirements for the degree. The special project requirement will usually be satisfied by taking a research project course in a group setting. A designated area of study may be indicated for each such research project course; in these cases, the instructor will offer direction in the area and will assist students in the development of substantial individual projects. Particular requirements or prerequisites may be set for the course or for those intending to complete a project. In appropriate cases having special approval, a student may elect to write a thesis or take a research project course (as listed in the catalog) on an individual basis.

**Required Courses**

| | | |
|---|---|---|
| IE | 601 | Introduction to Operations Research/Management Science |
| IE | 607 | Probability Theory |
| IE | 609 | Descriptive and Inferential Statistics |
| IE | 623 | Decision Analysis |
| IE | 624 | Quality Analysis |
| IE | 651 | Human Engineering I |
| IE | 655 | Manufacturing Analysis |
| IE | 681 | System Simulation |
| IE | 686 | Production and Inventory Analysis |
| IE | 688 | Design of Experiments |

Approved Electives (five courses, including project/thesis)

**Total credits:** 45

# Industrial Engineering Dual Degree Program (MBA/MSIE)

**Coordinator:** Alexis N. Sommers, Professor, PhD, Purdue University

The Graduate School has always encouraged interdisciplinary studies. To foster a broader expertise in the areas of business administration and industrial engineering, a student can earn degrees in both fields by successfully completing the dual degree program.

The program is intended for students with undergraduate engineering or technical degrees from programs accredited by the Accreditation Board for Engineering and Technology, or demonstrated equivalent. Students entering this program are expected to be competent in mathematics through calculus. Those with insufficient mathematics background will be required to take approved mathematics courses (e.g., M 610 Fundamentals of Calculus) outside/in addition to the program requirements.

Applicants with degrees in fields other than industrial engineering will be required to take a number of undergraduate courses or otherwise demonstrate proficiency in several areas normally included in an undergraduate industrial engineering program.

Applicants are required to meet the requirements outlined in the admissions policy sections of each of the relevant degree programs.

## MBA/MSIE Dual Degree

The MBA/MSIE program consists of 69 credit hours. Up to 9 of these credit hours may be waived on the basis of undergraduate coursework, leaving a minimum requirement of 60 credit hours. Any waiver(s) of coursework from the MBA side of the curriculum must meet the waiver guidelines of the MBA program. All waivers must be approved in writing by the appropriate department and are contingent upon subsequent academic performance. Graduate credit may be transferred from other accredited institutions subject to Graduate School policy on transfer credit detailed elsewhere in this catalog.

In all cases, the residency requirement for the two degrees shall be 60 credit hours completed at the University of New Haven.

### Project/Thesis Requirement

All students in the dual degree program must complete the required business administration capstone course MG 669 Strategic Management. In addition, all dual degree students must complete an industrial engineering special project or thesis within the elective portion of the program. The special project requirement may be satisfied by taking a project course in a group setting when offered. A designated area of study may be indicated for each such industrial engineering project course; in these cases, the instructor will offer direction in the area and will assist students in the development of substantial individual projects. Particular requirements or prerequisites may be set for the course or for those intending to complete a project. In appropriate cases having special approval, a student may take a research project or thesis (as listed in the catalog) on an individual basis.

**Required Courses**

**Business Core Courses (waivable)***

| | | |
|---|---|---|
| A | 620 | Financial Accounting for Managers |
| EC | 601 | Macroeconomics and Microeconomics |
| FI | 601 | Finance |
| MG | 637 | Management Process |
| MK | 609 | Marketing |

**Advanced Business Courses (not waivable)**

| | | |
|---|---|---|
| A | 621 | Managerial Accounting |
| FI | 602 | Corporate Valuation and Strategy |
| IB | 644 | Managing in Global Markets |
| MG | 645 | Management of Human Resources |
| EC | 629 | Business and Society |
| MG | 669 | Strategic Management |

**Industrial Engineering Courses**

| | | |
|---|---|---|
| IE | 601 | Introduction to Operations Research/Management Science |
| IE | 607 | Probability Theory |
| IE | 609 | Descriptive and Inferential Statistics |
| IE | 623 | Decision Analysis |
| IE | 624 | Quality Analysis |
| IE | 651 | Human Engineering I |
| IE | 655 | Manufacturing Analysis |
| IE | 681 | System Simulation |
| IE | 686 | Production and Inventory Analysis |
| IE | 688 | Design of Experiments |

Approved IE Electives (two courses, including IE thesis/project)

**Total credits: 69**

**Up to three of the five Business Core Courses (not more than 9 credits) may be waived by students who meet the waiver guidelines established within the MBA program.*

# Mechanical Engineering

**Coordinator:** Konstantine C. Lambrakis, Professor, PhD, Rensselaer Polytechnic Institute

This program is intended to meet the needs of professionally employed engineers and scientists for academic work beyond the baccalaureate level. Its purpose is to increase competence in modern analy-

sis and synthesis techniques as these apply to engineering design.

The program centers on a core sequence which all students are expected to take. The core courses contain advanced methods of analysis and design which are of common interest in engineering work. Students complete the program by electing a series of courses in mechanical engineering particularly suited to their current professional interests. Early in the program, students prepare, with the approval of the advisor, a detailed plan ensuring an overall educational experience that is integrated and logical.

All decisions regarding both core and elective requirements are subject to final approval by the student's advisor.

## Admission Policy

Candidates for admission to the master's program are normally expected to have a grade average of "B" or better in their undergraduate coursework and to hold a bachelor's degree in mechanical engineering from a program accredited by the Accreditation Board for Engineering and Technology, or demonstrated equivalent. In some cases, applicants with a bachelor's degree in a field closely related to mechanical engineering may be considered for admission. Students accepted on a provisional basis may be required to complete certain additional undergraduate mechanical engineering courses prior to enrolling in the graduate courses. It is strongly recommended that applicants submit scores from the Graduate Record Examination (GRE). Two letters of recommendation from individuals familiar with the applicant's potential for graduate study are also required.

## MSME

A minimum of 33 credits must be completed to earn the master of science degree in mechanical engineering. Depending on a student's academic background, one of the five required courses may be waived.

Transfer of credit from other institutions is subject to Graduate School policy on transfer credit. A thesis is optional but highly recommended for students wishing to study in depth particular areas of interest under the guidance of a faculty member. Thesis topics should be approved by the faculty advisor when the student has completed 18 graduate credits. Students should contact the coordinator for thesis advisors in these specialized areas: acoustics/aerodynamics, fluids/biomechanics, gas dynamics, heat transfer/thermodynamics, applied mechanics/optics, systems analysis/machine design/random vibrations/numerical analysis, solid mechanics/computer-aided design. Thesis preparation and submission must comply with Graduate School policy on theses as well as with all specific departmental requirements.

If a thesis is not chosen, and unless a major special project approved by the graduate program coordinator is completed within the scope of other mechanical engineering courses, a student will be required to undertake a three- or six-credit project, on an independent study basis, supervised by a full-time faculty member in the department of mechanical engineering.

**Required Courses*(15 credits)**

| | |
|---|---|
| ME 602 | Mechanical Engineering Analysis |
| ME 610 | Advanced Dynamics |
| ME 615 | Theory of Elasticity |
| ME 620 | Classical Thermodynamics |
| ME 630 | Advanced Fluid Mechanics |

**Elective Courses**(18 credits)**

| | |
|---|---|
| ME 604 | Numerical Techniques in Mechanical Engineering |
| ME 605 | Finite Element Methods in Engineering |
| ME 611 | System Vibrations |
| ME 613 | Fundamentals of Acoustics |
| ME 625 | Mechanics of Continua |
| ME 627 | Computer-Aided Engineering |
| ME 632 | Advanced Heat Transfer |
| ME 635 | Dynamic Systems and Control |
| ME 645 | Computational Fluid Dynamics and Heat Transfer |
| ME 655 | Interfacing Mechanical Devices |
| ME 670 | Selected Topics |
| ME 690 | Research Project |
| ME 695/696 | Independent Study I and II |
| ME 698/699 | Thesis I and II |

Total credits: 33

**With the coordinator's written approval, one of the required courses may be waived depending on the student's academic background.*

***With the coordinator's written approval, three of the elective courses may be taken in departments other than mechanical engineering.*

# Graduate Certificates

The Tagliatela College of Engineering offers the following graduate certificates designed as options for those having a baccalaureate degree, or a master's degree, who want to enroll in a part-time, short, coherent course of study at the graduate level. Those who may not yet be ready to commit themselves to a full-length graduate program, as well as those who already hold a graduate degree but want to pursue additional work in the same or another field, may find that a certificate provides the perfect alternative.

Students applying to the Graduate School to enter a graduate certificate program must complete the Graduate School application form and submit official transcripts showing completion of the undergraduate/baccalaureate degree and two letters of recommendation.

See the Table of Contents for the Academic Policies section of the catalog to find a complete description of the options, regulations, and requirements for study and completion of a graduate certificate.

## Civil Engineering Design Certificate

**Advisor:** Agamemnon D. Koutsospyrous, Professor, PhD, Polytechnic University

This certificate provides professional studies beyond the baccalaureate level in the major disciplines within civil engineering. The student, with the advisor, selects courses that best satisfy the student's professional interests. Areas of specialization are construction, geotechnical engineering, hydraulics and hydrology, and structural engineering.

Candidates for admission will be expected to have an engineering degree from a program accredited by the Accreditation Board for Engineering and Technology, or demonstrated equivalent. Engineering degrees presented from foreign institutions will be evaluated individually. Candidates are required to complete four courses or a total of 12 credits for the certificate. Courses must be selected, with the advisor's approval, from the following:

| | | |
|---|---|---|
| CE | 615 | Groundwater Hydrology |
| CE | 620 | Engineering Hydrology |
| CE | 621 | Advanced Hydrology |
| CE | 623 | Open Channel Hydraulics |
| CE | 624 | Computer Applications in Hydrology/Hydraulics |
| CE | 629 | Wood Engineering I |
| CE | 630 | Reinforced Concrete Design |
| CE | 631 | Structural Steel Design |
| CE | 633 | Wood Engineering II |
| CE | 634 | Prestressed Concrete Design |
| CE | 640 | Structural Analysis |
| CE | 650 | Soil Mechanics I |
| CE | 651 | Soil Mechanics II |
| CE | 652 | Foundation Engineering I |
| CE | 653 | Foundation Engineering II |
| CE | 660 | Project Planning |
| CE | 678 | Computer Applications in Civil Engineering |

**Total credits: 12**

## Computer Applications Certificate

**Coordinators**

**Graduate Advisor:** Barun Chandra, Associate Professor, PhD, University of Chicago

**Graduate Admissions Coordinator:** Tahany Fergany, Professor, PhD, University of Connecticut

| | | |
|---|---|---|
| CS | 610 | Intermediate Programming/C |
| CS | 620 | Data Structures |

*Plus two of the following:*

| | | |
|---|---|---|
| CS | 617 | Java Programming |
| CS | 622 | Database Systems |
| CS | 622B | Advanced Database Systems |
| CS | 623 | Rapid Software Development/ Visual Basic |
| CS | 627 | Distributed Database Systems |
| CS | 634 | Cryptography and Data Security |
| CS | 650 | Computer Graphics |
| CS | 655 | Internet Applications with Java |

| | | |
|---|---|---|
| CS | 657 | Programming Window Systems |
| CS | 660 | Artificial Intelligence |
| CS | 663 | Mobile Robotics |
| CS | 665 | Digital Image Processing |

**Total credits: 12**

## Computer Programming Certificate

**Coordinators**

**Graduate Advisor:** Barun Chandra, Associate Professor, PhD, University of Chicago

**Graduate Admissions Coordinator:** Tahany Fergany, Professor, PhD, University of Connecticut

| | | |
|---|---|---|
| CS | 610 | Intermediate Programming/C |
| CS | 620 | Data Structures |

*Plus one of the following:*

| | | |
|---|---|---|
| CS | 617 | Java Programming |
| CS | 623 | Rapid Software Development/ Visual Basic |
| CS | 626 | Object-Oriented Principles and Practice/C++ |

*Plus one of the following:*

| | | |
|---|---|---|
| CS | 617 | Java Programming |
| CS | 623 | Rapid Software Development/ Visual Basic |
| CS | 626 | Object-Oriented Principles and Practice/C++ |
| CS | 647 | Systems Programming |
| CS | 652 | Script Programming for Network Administration |

**Total credits: 12**

## Computing Certificate

**Coordinators**

**Graduate Advisor:** Barun Chandra, Associate Professor, PhD, University of Chicago

**Graduate Admissions Coordinator:** Tahany Fergany, Professor, PhD, University of Connecticut

| | | |
|---|---|---|
| CS | 610 | Intermediate Programming/C |

*Plus any three Computer Science Restricted Electives from the list in the description of the MS Computer Science program.*

**Total credits: 12**

## Lean - Six Sigma Certificate

**Advisor:** Alexis N. Sommers, Professor, PhD, Purdue University

Lean approaches to production, operations, and processes translate to improved quality, shorter lead-time, and lower cost. Lean is needed for survival in the current global marketplace, and to become competitive means to become Lean. This certificate is designed for professionals who wish to learn about the latest in the concepts of Lean - Six Sigma and the techniques that are used to implement Lean in an organization, whether it be service, manufacturing, or any other. A total of four courses (12 credit hours) composes the requirements for this certificate, as listed below. Applicants are expected to have a background in statistics. The certificate academic advisor may allow substitutions to best meet the professional needs of the students. The courses taken for this certificate are applicable toward the MS in Industrial Engineering.

| | | |
|---|---|---|
| EM | 604 | Concepts of Engineering and Quality Management |
| EM | 627 | Value Engineering and Design |
| EM | 628 | Six Sigma Quality Planning |
| EM | 639 | Achieving Optimal Operations |

**Total: 12 credit hours**

## Logistics Certificate

**Advisor:** Alexis N. Sommers, Professor, PhD, Purdue University

This certificate provides a basic working knowledge of logistics in all sectors, and it gives students a background for certification in one of the professional societies serving the discipline. Although an old field of study historically associated with the military, logistics has emerged as a key element in world commerce, including e-commerce and integrated manufacturing.

Modern logistics makes sure that needs are met

on demanding timetables, creating effective customer supply chains that reach around the globe and effective customer support mechanisms that keep people and machines working productively under both benign and hostile environmental conditions. From Mexican product assembly centers to Pacific Rim manufacturers, from New York copier repairmen to engineers repairing rigs in the North Sea, logistics systems function to get the job done right, on time, and at lowest cost.

Logistics involves product planning, synchronous manufacturing, quality assurance, life cycle cost analysis, transportation and distribution ERP and JIT, CRM and MRO, and the deployment of educated and experienced logisticians. World-class corporations as well as government agencies and military units require well-designed, effective, efficient logistics systems to achieve their goals and objectives. Career professionals generally acquire a certificate in logistics or a specialized graduate degree.

LG 660 Logistics Technology and Management

*Plus three of the following:*

IE 615 Transportation and Distribution
LG 663 Logistics in Acquisition and Manufacturing
LG 665 Integrated Logistics Support Analysis
LG 669 Life Cycle Cost Analysis

Total credits: 12

Other logistics/related courses may be substituted with the approval of the certificate advisor.

## Network Administration Certificate

Coordinators

**Graduate Advisor:** Barun Chandra, Associate Professor, PhD, University of Chicago

**Graduate Admissions Coordinator:** Tahany Fergany, Professor, PhD, University of Connecticut

CS 642 Computer Networks and Data Communication
CS 645 Network Administration

*Plus two of the following:*

CS 634 Cryptography and Data Security
CS 646 Introduction to Computer Security
CS 646B Topics in Computer Security
CS 649 Network Analysis
CS 649B LAN/WAN Internetworking
CS 652 Script Programming for Network Administration

Total credits: 12

## Quality Engineering Certificate

**Advisor:** Alexis N. Sommers, Professor, PhD, Purdue University

This certificate is designed to provide quality and reliability professionals who are interested in advancing their knowledge and skills with the most up-to-date analytic techniques and standards in the areas of quality assurance and control, reliability engineering, and experimental design. The program provides a solid foundation in probability and statistical methods, followed by specialized courses in quality, including the ISO standards; in reliability, including reliability algorithms and models; and in experimental design, including covering factorial and Taguchi methods. The courses taken for this certificate are applicable toward the MS in Industrial Engineering.

IE 607 Probability Theory
IE 609 Descriptive and Inferential Statistics
IE 624 Quality Analysis

*Plus one of the following:*

IE 643 Reliability and Maintainability
IE 688 Design of Experiments

Total credits: 12

# HENRY C. LEE COLLEGE OF CRIMINAL JUSTICE & FORENSIC SCIENCES

Thomas A. Johnson, DCrim, Dean
William M. Norton, JD, Associate Dean

Through the Graduate School, the Henry C. Lee College of Criminal Justice & Forensic Sciences offers career-oriented graduate degree programs in criminal justice, fire science, forensic science (including the criminalistics laboratory program), and national security and public safety. In addition, a wide range of graduate certificates is available in the same fields for students seeking shorter study in specific subcategories of these disciplines.

Broad professional education is provided, often integrating classroom learning with laboratory and field experience. The programs attract students of varied ages and levels of expertise, from individuals new to the field to seasoned professionals seeking national and/or regional accreditation and licensure.

The Henry C. Lee College of Criminal Justice and Forensic Sciences is divided into three academic departments: the Departments of Criminal Justice, Forensic Science, and Fire Science and Professional Studies.

In addition to the graduate programs at the main campus in West Haven, the university is authorized to offer master of science degrees in national security and public safety, at its California location at the UNH Sandia Laboratory Campus in Livermore. Graduate certificates in these two areas, plus a certificate in forensic computer investigation, are also available at the California site. Authorization for UNH to operate in California is granted through the Bureau for Private Postsecondary and Vocational Education, which oversees and monitors the university's compliance with regulations set forth in the California Education Code and is the student's primary advocate in matters of consumer protection.

## Criminal Justice

Coordinator: James J. Cassidy, PhD, Hahnemann University; JD, Villanova University

A key objective of the master of science in criminal justice program is the education of men and women planning careers in the field of criminal justice as well as the advanced training and education of those who staff the agencies and institutions of the criminal justice system. The program stresses a broad understanding of the social and behavioral sciences, the institutions of the criminal justice system, and the development of methodological tools and skills.

Courses in the area of social and behavioral science stress theories of the behavior of man in a social order and the sanctions imposed by different societies to control the social behavior of their members. Courses in the area of criminal justice institutions stress the study of the existing system from the police through the courts, the penitentiaries, and the system of probation and parole. The methodological courses expose students to the tools of research and analysis and the contribution of systems analysis to the efficient administration of the criminal justice system.

### MS, Criminal Justice

A total of 36 credit hours is required for the degree of master of science in criminal justice. Some students will also be required to complete an additional three credits (frequently CJ 610 Administration of Justice) if the graduate advisor finds that they do not have an adequate background in criminal justice. All degree candidates must complete the core curriculum. After consultation with an advisor, students select electives from a list of approved courses.

Applicants are required to take the Graduate Records Exam (GRE) General Test and submit their scores to Graduate Admissions. The transfer of credit from other institutions will be permitted subject to the Graduate School policy on transfer credit detailed elsewhere in this catalog.

### Thesis or Comprehensive Examination

Students may elect to undertake a thesis project in partial fulfillment of the requirements for the degree. Registration for a minimum of six thesis credits (CJ 697 and CJ 698) would be required. The thesis must show ability to organize materials in a clear and original manner and to present well-reasoned conclusions. Thesis preparation and submission must comply with the Graduate School policy on theses as well as all specific departmental requirements. Detailed information concerning these requirements is available from the student's advisor.

Students who do not elect to undertake thesis work must pass a comprehensive final examination. This examination may be oral, written, or both and will be based on the program of study that the student has completed for the degree. Additional information about the comprehensive examination is available from the student's advisor.

**Required Courses—General Program (No Concentration)**

| | | |
|---|---|---|
| CJ | 601 | Mental Health, Law, and Criminal Justice |
| CJ | 605 | Theories of Criminal Behavior |
| CJ | 611 | Research Methods in Criminal Justice |
| CJ | 613 | Quantitative Analysis in Criminal Justice |

Approved Electives (eight courses)

**Total credits: 36**

As an alternative to the program listed above, a student may select one of the following concentrations. However, all students must complete the four core curriculum classes listed above. CJ 601 and CJ 611 are offered in the fall term, and CJ 605 and CJ 613 in the winter term, each academic year.

## Concentrations

There are optional concentrations —forensic psychology, criminal justice management, forensic computer investigation, crime analysis, and victimology — from which students may choose more specialized programs of study. In addition to these concentrations, students may elect to complete one of the graduate certificate programs available in criminal justice, forensic science, or fire science.

### Concentration in Crime Analysis

The concentration in crime analysis is designed to prepare students for careers with police, private, and justice system organizations that utilize crime analysis in their management and decision-making functions. The program focuses on understanding and analyzing patterns of crime and violence to enable agencies to better respond to public safety issues and problems.

| | | |
|---|---|---|
| CJ | 601 | Mental Health, Law, and Criminal Justice |
| CJ | 605 | Theories of Criminal Behavior |
| CJ | 611 | Research Methods in Criminal Justice |
| CJ | 613 | Quantitative Analysis in Criminal Justice |

**Concentration Courses**

| | | |
|---|---|---|
| CJ | 655 | Crime Prevention Through Environmental Design |
| CJ | 656 | Problem-Oriented Policing |
| CJ | 657 | Crime Mapping and Analysis |
| CJ | 690 | Research Project in CJ |
| E | 659 | Writing and Speaking for Professionals |
| EN | 640 | Introduction to Geographical Information Systems |

Restricted Electives—two courses (six credits)

**Total Credits: 36**

### Concentration in Criminal Justice Management

This concentration is designed for those wishing to pursue a career in the management of a criminal

justice agency. Courses are offered jointly by the criminal justice and the public administration programs.

| | | |
|---|---|---|
| CJ | 601 | Mental Health, Law, and Criminal Justice |
| CJ | 605 | Theories of Criminal Behavior |
| CJ | 611 | Research Methods in Criminal Justice |
| CJ | 613 | Quantitative Analysis in Criminal Justice |

**Concentration Courses**

| | | |
|---|---|---|
| CJ | 612 | Criminal Justice Management |
| CJ | 637 | Criminal Justice Policy |
| PA | 602 | Public Policy Formulation and Implementation |
| | | *or* |
| PA | 620 | Personnel Administration and Collective Bargaining in the Public Sector |
| PA | 630 | Fiscal Management for Local Government |
| | | *or* |
| PA | 632 | Public Finance and Budgeting |

Approved Electives (four courses)

**Total Credits: 36**

## Concentration in Forensic Computer Investigation

This concentration is designed for those who wish to enhance their knowledge and prepare for careers in computer and electronic investigation areas within federal, state, or local governmental or corporate organizations.

| | | |
|---|---|---|
| CJ | 601 | Mental Health, Law, and Criminal Justice |
| CJ | 605 | Theories of Criminal Behavior |
| CJ | 611 | Research Methods in Criminal Justice |
| CJ | 613 | Quantitative Analysis in Criminal Justice |

**Concentration Courses**

| | | |
|---|---|---|
| CJ | 600 | Computer Crime: Legal Issues and Investigative Procedures |
| CJ | 603 | Internet Vulnerabilities and Criminal Activity |
| CJ | 604 | Network Security, Data Protection, and Telecommunication |

**Restricted Electives**
**Five of the following:**

| | | |
|---|---|---|
| CJ | 606 | Domestic and Sexual Violence |
| CJ | 608 | Law and Evidence |
| FOR | 614 | Survey of Forensic Science |
| FOR | 616 | Advanced Crime Scene Investigation |
| FOR | 632 | Advanced Investigation I |
| FOR | 633 | Advanced Investigation II |
| CJ | 651 | Criminal Procedure |
| CJ | 657 | Crime Mapping and Analysis |

**Total credits: 36**

## Concentration in Forensic Psychology

This program, offered jointly by the departments of criminal justice and psychology, is designed for those currently working in the justice system, or those planning such a career, who are interested in how psychology and law interact in the administration of justice.

| | | |
|---|---|---|
| CJ | 601 | Mental Health, Law, and Criminal Justice |
| CJ | 605 | Theories of Criminal Behavior |
| CJ | 611 | Research Methods in Criminal Justice |
| CJ | 613 | Quantitative Analysis in Criminal Justice |
| CJ | 693 | Criminal Justice Internship I* |

**Concentration Courses**

| | | |
|---|---|---|
| CJ | 623 | Mental Health Law |
| CJ | 646 | Abnormal Psychology in Forensic Settings |
| CJ | 647 | Forensic Assessment |
| CJ | 648 | Forensic Treatment Models |
| P | 605 | Survey of Community Psychology |
| P | 611 | Individual Intervention Seminar* |
| P | 628 | The Interview |
| P | 629 | Introduction to Psychotherapy and Counseling |

**Total credits: 36-39**

**CJ 693 Criminal Justice Internship I is required for students who do not have experience working with clients in a counseling setting. It is to be taken prior to or in the same term as P 611 Individual Intervention Seminar.*

### Concentration in Victimology

This concentration provides students with an interdisciplinary, practice-oriented program. It prepares them for entry into a wide variety of positions in law enforcement, criminal justice, the courts, corrections, and victim services programs, as well as professional settings involving work with victims of crime, their families, and the community at large. The curriculum encourages a broad-based training experience focusing on the enhancement of the appropriate involvement of victims in the justice system and the provision of services to victims and survivors.

| | | |
|---|---|---|
| CJ | 601 | Mental Health, Law, and Criminal Justice |
| CJ | 605 | Theories of Criminal Behavior |
| CJ | 613 | Quantitative Analysis in Criminal Justice |
| CJ | 611 | Research Methods in Criminal Justice |

Concentration Courses

| | | |
|---|---|---|
| CJ | 606 | Domestic and Sexual Violence |
| CJ | 617 | Advanced Victimology |
| CJ | 618 | Crime Victims' Rights and Services |
| CJ | 693 | Criminal Justice Internship I* |
| P | 611 | Individual Intervention Seminar* |

Approved Electives (three courses)*

Total credits: 36

**CJ 693 Criminal Justice Internship I is to be taken prior to or in the same term as P 611 Individual Intervention Seminar. Students may be required and/or approved to take CJ 694 Criminal Justice Internship II based on experience, ability, and background. With the approval of the advisor, students choosing the Thesis Option will utilize CJ 698/699 Thesis I/II for two courses (6 credits) of the Free Elective portion of the program*

# Fire Science

**Director:** Robert E. Massicotte, Jr., Assistant Professor, MS, University of New Haven

Fire science is an interdisciplinary master's program designed to provide an advanced technical background for fire service, fire safety, occupational safety, and security professionals who are involved with fire protection and investigation. Fire protection specialists require knowledge of the science and methodology for preserving lives and property by preventing or minimizing losses resulting from fires, explosions, accidents, and related hazards. Current national data indicate that trained fire protection specialists are in extremely limited supply. Initial job opportunities in the insurance field, industry, and government service may involve applications in engineering, research and product design, building and systems design, fire hazard analysis, marketing of equipment, or insurance. The fire science program and courses cover a wide range of topics including the proper design, arrangement, and use of building materials; analysis of fire and explosion hazards; safe design of industrial processes; management of property loss control and insurance programs; investigation of fires; management in the public sector; and safe design, selection, and handling of equipment and materials. Updated skills are provided in the application of fire protection principles to fire department, water supply, and building code aspects of community planning.

In addition to the graduate fire science program at the main campus in West Haven, the university is authorized to offer the master of science in fire science at its California location in Riverside. Graduate certificates in fire science are also available at the California site. Authorization for UNH to operate in California is granted through the Bureau for Private Postsecondary and Vocational Education, which oversees and monitors the university's compliance with regulations set forth in the California Education Code and is the student's primary advocate in matters of consumer protection.

## MS, Fire Science

Candidates are required to complete a minimum of 39 credit hours of graduate work, which may include an internship in fire science. Transfer credit from other institutions may be permitted subject to the Graduate School policy on transfer credit detailed elsewhere in this catalog. Students in the fire science degree program are required to complete the required core courses; a concentration in fire administration, fire/arson investigation, fire science technology, or public safety management; and 18 credits of electives. Students must take either FS 690 Research Seminar or FS 693 Internship. A six-credit thesis may replace one elective and the research seminar or internship requirement. Students electing to write a thesis must register for thesis credit with the department. The thesis must show the ability to organize material in a clear and original manner and to present well-reasoned conclusions. Thesis preparation and submission must comply with Graduate School policy on theses as well as specific departmental requirements.

Required Courses

| | | |
|---|---|---|
| FS | 625 | Chemistry of Fires and Explosions |
| FS | 669 | Dynamics, Evaluation, and Prevention of Structural Fires |
| FS | 690 | Research Project |
| | | *or* |
| FS | 693 | Internship |

Concentration (12-13 credits)
Approved Electives (18 credits)

**Total credits: 39-40**

### Concentration in Fire Administration

One Computer Science (CS) Elective
MG 637 Management Process
Two Public Administration (PA) Electives

**Total credits: 12**

### Concentration in Fire/Arson Investigation

| | | |
|---|---|---|
| FOR | 614 | Survey of Forensic Science |
| FS | 649 | Fire Scene Investigation and Arson Analysis (4 credits) |
| FS | 650 | Arson for Profit |
| FS | 665 | Legal Aspects of Fire/Arson Investigation |

**Total credits: 13**

### Concentration in Fire Science Technology

| | | |
|---|---|---|
| FS | 661 | Systems Approach to Fire Safety |
| FS | 663 | Fire Protection Systems Application |
| FS | 666 | Industrial Fire Protection |

One Occupational Safety and Health (SH) Elective

**Total credits: 12**

### Concentration in Public Safety Management

| | | |
|---|---|---|
| FS | 631 | Organization and Management of Public Fire Protection |
| FS | 632 | Strategic Planning for the Fire Service |
| FS | 633 | Issues in Public Safety Professional Responsibility |
| FS | 634 | Issues in Public Safety Management |

**Total credits: 12**

Elective Courses

| | | |
|---|---|---|
| FS | 649 | Fire Scene Investigation and Arson Analysis (4 credits) |
| FS | 650 | Arson for Profit |
| FS | 661 | Systems Approach to Fire Safety |
| FS | 663 | Fire Protection Systems Application |
| FS | 664 | Terrorism |
| FS | 665 | Legal Aspects of Fire/Arson Investigation |
| FS | 666 | Industrial Fire Protection |
| FS | 667 | Fire and Building Codes, Standards, and Practices |
| FS | 668 | Fire and Casualty Insurance Practices |
| FS | 684 | Fire/Accident Scene Reconstruction |

In addition to the above, approved courses from other departments may be taken as electives with the consent of the director of the program.

See the Table of Contents for the certificates in fire science and public safety management.

# Forensic Science

Director: Timothy M. Palmbach, Associate Professor, MS, University of New Haven; JD, University of Connecticut

Forensic science is a broad, interdisciplinary field in which the natural sciences are employed to analyze and evaluate physical evidence in matters of the law. The interdisciplinary forensic science program has three concentrations: criminalistics, fire science, and advanced investigation. In addition to the MS degree programs, professional certificates are offered in all the specialties for those who want certification in a second track or who require only the specialized courses. The criminalistics concentration provides advanced technical background for those wishing to enter the criminalistics field as professional laboratory examiners. The fire science concentration provides advanced training in arson scene investigation, laboratory analysis of arson-related evidence, and related aspects of arson and fire investigation. The advanced investigation concentration provides advanced training in forensic sciences and in investigation techniques and is designed for students interested in applying forensic science to investigations, forensic identification, crime scene processing, and related work.

The program and courses stress not only up-to-date analytical and scientific methods but also a broad understanding of the concepts underlying the forensic sciences. Degree programs in forensic science require a sequence of core courses, followed by concentration requirement courses and a flexible offering of electives designed to meet individual interests. Degree requirements can be fulfilled in five trimesters. (Note: the Sacramento Campus offers a one-year accelerated program.)

In addition to the graduate forensic science program at the main campus in West Haven, the university offers the master of science in forensic science with a concentration in advanced investigation at its California location in Sacramento. Graduate certificates in advanced investigation and in forensic computer investigation are also available at the California site. Authorization for UNH to operate in California is granted through the Bureau for Private Postsecondary and Vocational Education, which oversees and monitors the university's compliance with regulations set forth in the California Education code and is the student's primary advocate in matters of consumer protection.

## Admission Policy

Because admissions criteria differ, at the time of initial application students must specify which one of the three concentrations they plan to pursue. Students who later decide to change concentration may be required to re-apply.

For admission to the criminalistics concentration students must have an undergraduate degree in a natural science (chemistry, biology, or physics) or forensic science from an accredited institution. Applicants should have taken at least one year of general chemistry with lab, one year of organic chemistry with lab, and one semester of instrumental analysis or analytical chemistry with lab. A semester of biochemistry with lab and a year of physics with lab are highly recommended.

For criminalistics concentration applicants planning to pursue forensic biology, recommended undergraduate coursework includes biochemistry, genetics, molecular biology, statistics, and population genetics, or other subjects which provide a foundation knowledge base for forensic DNA analysis. Applications will be strengthened by an overall undergraduate average of at least 3.0 (on a 4.0 scale) and grades of "B" or better in science and mathematics courses. Applicants for the criminalistics concentration are required to take the Graduate Record Examination (GRE) General Test and submit their scores to Graduate Admissions as part of their application. Applications will be strengthened by verbal scores falling at or above the 50th percentile and by quantitative/analytical scores falling at or above the 70th percentile.

For admission to the advanced investigation or fire science concentration students must have earned a baccalaureate degree from an accredited institution. The degree need not be in the natural sciences, and the GRE is not required. Applications will be strengthened by natural science coursework and by an overall undergraduate average of at least 3.0 (on a 4.0 scale).

All applications must be accompanied by two letters of recommendation. Letters should come from persons familiar with the applicant's academic skills, performance, and promise. Typically, such recommenders will be current or former professors and/or employers. All applications should be accompanied by a short (no more than one page) statement that addresses the basis of the applicant's interest in forensic science as well as personal and professional goals and how completion of this degree program is expected to further those goals.

Admission to the forensic science program will be granted for the fall trimester only. The application deadline for the forensic science program will be March 1 for the following fall trimester. Applicants may expect an admissions decision about the middle of March in the year for which they have applied.

## MS, Forensic Science

Candidates are required to complete 40 credit hours of graduate work over a period of five trimesters. Transfer of credit from other institutions may be permitted subject to the Graduate School policy on transfer credit detailed elsewhere in this catalog. At the time of application to the forensic science program, applicants must specify one of the three areas of concentration.

### Thesis

Students may elect to write a thesis in lieu of FOR 686 Forensic Science Research Project I/ FOR 688 Forensic Science Internship I and three credits of elective coursework. Registration for a minimum of six thesis credits (FOR 697, FOR 698) would be required. The thesis must show an ability to organize material in a clear and original manner and to present well-reasoned conclusions. Thesis preparation and submission must comply with the Graduate School policy on theses as well as all specific departmental requirements.

**Required Courses**

| | |
|---|---|
| FOR 614 | Survey of Forensic Science |
| FOR 620 | Advanced Criminalistics I |
| FOR 640 | Advanced Criminalistics II |
| FOR 653 | Physical Analysis in Forensic Science |
| FOR 686 | Forensic Science Research Project I |
| | *or* |
| FOR 688 | Forensic Science Internship I |

Plus required concentration courses (see below)

**Total credits: 40**

**Elective Courses**

| | |
|---|---|
| CJ 600 | Computer Crime: Legal Issues and Investigative Procedures |
| CJ 602 | Computers, Technology, and National Security Information Management Systems |
| CJ 603 | Internet Vulnerabilities and Criminal Activity |
| CJ 604 | Network Security, Data Protection, and Telecommunication |
| CJ 606 | Domestic and Sexual Violence |
| CJ 607 | Psychological Applications in Criminal Justice |
| CJ 608 | Law and Evidence |
| CJ 610 | Administration of Justice |
| FOR 645 | Drug Chemistry and Identification |
| FOR 670 | Selected Topics |
| FOR 695 | Independent Study |
| SH 602 | Safety Organizations and Administration |
| SH 615 | Toxicology |
| SH 620 | Occupational Safety and Health Law |
| SH 630 | Product Safety and Liability |

In addition, other concentration courses (in lists from which one, two, or more must be taken) may fulfill elective requirements. Courses listed as requirements for one of the concentrations may be taken as electives for other concentrations with the permission of the student's faculty advisor.

### Concentration in Advanced Investigation

| | |
|---|---|
| FOR 616 | Advanced Crime Scene Investigation |
| FOR 632 | Advanced Investigation I |
| FOR 633 | Advanced Investigation II |
| FOR 661 | Medicolegal Investigation and Identification |

*Plus one of the following:*

| | | |
|---|---|---|
| CJ | 608 | Law and Evidence |
| CJ | 651 | Criminal Procedure |
| CJ | 652 | Sexual Offenders and Predators |
| PS | 605 | Criminal Law |

### Concentration in Criminalistics

| | |
|---|---|
| FOR 621 | Advanced Criminalistics I Laboratory (1 credit) |
| FOR 641 | Advanced Criminalistics II Laboratory (1 credit) |
| FOR 654 | Physical Analysis in Forensic Science Laboratory (1 credit) |
| FOR 673 | Biomedical Methods in Forensic Science |
| FOR 674 | Biomedical Methods in Forensic Science Laboratory (1 credit) |

*Plus two of the following:*

| | |
|---|---|
| CH 621 | Chemical Forensic Analysis with Laboratory (4 credits) |
| CH 631 | Advances in Analytic Chemistry |
| FOR 645 | Drug Chemistry and Identification |
| FOR 660 | Forensic Microscopy (4 credits) |
| FOR 661 | Medicolegal Investigation and Identification |
| FOR 662 | Forensic Toxicology (4 credits) |
| FOR 663 | Advanced Forensic Serology I |
| FOR 664 | Advanced Forensic Serology II |

### Concentration in Fire Science

| | |
|---|---|
| FOR 625 | Chemistry of Fires and Explosions |
| CJ 649 | Fire Scene Investigation and Arson Analysis (4 credits) |
| CJ 608 | Law and Evidence |
| | *or* |
| CJ 651 | Criminal Procedure |
| | *or* |
| FS 665 | Legal Aspects of Fire and Arson Investigation |
| | *or* |
| PS 605 | Criminal Law |

*Plus one of the following:*

| | |
|---|---|
| CJ 667 | Fire and Building Codes, Standards, and Practices |
| CJ 668 | Fire and Casualty Insurance Practices |
| CJ 669 | Dynamics, Evaluation, and Prevention of Structural Fires |
| CJ 684 | Fire/Accident Scene Reconstruction |

See Table of Contents for certificates in forensic science.

# National Security and Public Safety

**Director:** Dean Thomas A. Johnson, Professor, DCrim, University of California, Berkeley

The National Security and Public Safety program is the result of the collaborative efforts of the Criminal Justice and Political Science Departments at the University of New Haven. The program is administered by the Dean's Office of the Henry C. Lee College of Criminal Justice & Forensic Sciences and operates at our main campus in West Haven, Connecticut, as well as being hosted by Sandia National Laboratories in Livermore, California; Albuquerque, New Mexico; and at our Crystal City site in Arlington, Virginia. Students applying to the program should therefore designate the campus to which they are applying.

The National Security Program provides students with an understanding of the fundamental principles of the legal charter, presidential executive orders, and the framework which guides the operation of national security agencies. Specifically, the role and function of the U.S. agencies comprising the intelligence community will be analyzed, with emphasis on Information Protection and Security. The concentration in Information Protection and Security provides a unique approach to the issues of cyberterrorism and the protection of information management systems within our national security agencies. Research issues in public safety emergency management and homeland security will be emphasized. Finally, corporate security and its new relationship to the role of homeland and national security will comprise a rich element of research inquiry.

## MS, National Security and Public Safety

Candidates are required to complete a minimum of 36 credit hours of graduate work, which may include an internship in national security. Transfer credit from other institutions may be permitted subject to the Graduate School policy on transfer credit detailed elsewhere in this catalog.

Students in the program are required to complere 15 credit hours of required core courses, 9 credit hours of restricted elective credits from the list below, and 12 credits of general electives with advisor approval. Students must complete a capstone requirement of either NSP 690 Research Project or NSP 693 National Security Internship as part of the program: or NSP 697; NSP 698; NSP 699 Thesis.

**Required Courses (15 Credits)**

| | |
|---|---|
| NSP 601 | National Security Programs: Architecture and Mission |
| NSP 602 | Personnel Security Programs |
| NSP 603 | National Security Charter, Legal Issues, and Executive Orders |
| NSP 604 | Securing National Security Information Systems |
| NSP 690 | Research Project I |
| | *or* |
| NSP 693 | National Security Internship I |
| | *or* |
| NSP 697 | Thesis I |
| | *or* |
| NSP 698 | Thesis II |
| | *or* |
| NSP 699 | Thesis III |

*Plus 21 credits of electives chosen with Dean's approval from the following:*

**Elective Courses (21 Credits)**

| | |
|---|---|
| CJ 602 | Computers, Technology, and National Security Information Management Systems |
| NSP 606 | Contemporary Issues in National Security Programs |
| NSP 607 | Architecture of Protected Information |
| NSP 610 | NSP Cost Modeling and Contract Administration |
| NSP 611 | NSP Situational Evaluation and Failure Analysis Models |
| NSP 612 | Integrated Studies in Safeguards and Countermeasure Designs |
| NSP 613 | NSP Issues in Research and Policy Analysis |
| NSP 620 | Bioterrorism and Biodefense |
| NSP 621 | NS Incident Mapping |
| NSP 630 | Risk Assessment & Management in National Security |
| NSP 641 | NS World and National Threat Modeling |
| NSP 642 | Integrated Studies of the Intelligence and Counterintelligence Communities |
| NSP 643 | Seminar in Sensitive Evaluation Techniques, Safeguards, and Countermeasures |
| NSP 644 | Cross-Impact Analysis: National Security Futures Issues |
| NSP 645 | National Security Issues in Deception |
| NSP 646 | The Structure of National Security Decisions |
| NSP 647 | The Economics of National Security Administration |
| NSP 648 | Achieving Excellence in National Security Futures Issues |
| NSP 651 | A Study of Designated Approving Authorities Criteria |
| NSP 652 | System Administration in Information Systems Security |
| NSP 653 | Information Systems Security Officers |
| NSP 654 | Information System Approval and Certification |
| NSP 668 | Weapons of Mass Destruction I: Chemical and Biological Agents |
| NSP 669 | Weapons of Mass Destruction II: Radiological Agents |
| NSP 691 | Research Project II |
| NSP 694 | National Security Internship I |
| NSP 695 | Independent Study |
| NSP 697 | Thesis I |
| NSP 698 | Thesis II |

NSP 699 Thesis III

Total Credits: 36

### Concentration in Information Protection and Security

This concentration provides a unique approach to the issue of cyberterrorism and the protection of information management systems within our national security agencies. Students will be prepared for the responsibilities of protecting agency or corporate information systems. The basics of information systems security as well as the legal issues and cyber-response strategies will be reviewed. Computer gaming simulations as well as online attack and defense techniques will be presented for student assignments.

**Required Courses (15 Credits)**

| | |
|---|---|
| NSP 601 | National Security Programs: Architecture and Mission |
| NSP 602 | Personnel Security Programs |
| NSP 603 | National Security Charter, Legal Issues, and Executive Orders |
| NSP 604 | Securing National Security Information Systems |
| NSP 690 | Research Project I |
| | *or* |
| NSP 693 | National Security Internship I |

*Plus four of the following:*

| | |
|---|---|
| CJ 625 | Information Systems: Threats, Attacks, and Defenses |
| CJ 626 | Firewalls and Secure Enterprise Computing |
| CJ 627 | Internet and Audit Based Computer Forensics |
| CJ 628 | Computer Viruses and Malicious Code |
| CJ 629 | Introduction to Practical Issues in Cryptography |
| CJ 680 | Research Issues in Cyberterrorism |

*Plus 9 credits of electives chosen with Dean's approval from the following:*

| | |
|---|---|
| NSP 607 | Architecture of Protected Information |
| NSP 644 | Cross-Impact Analysis: National Security Futures Issues |
| NSP 651 | A Study of Designated Approving Authorities Criteria |
| NSP 652 | System Administration in Information Systems Security |
| NSP 653 | Information Systems Security Officers |
| NSP 654 | Information System Approval and Certification |

## Graduate Certificates

The Henry C. Lee College of Criminal Justice & Forensic Sciences offers the following graduate certificates designed as options for persons having a baccalaureate degree, or a master's degree, who want to enroll in a part-time, short, coherent course of study at the graduate level. Persons who may not yet be ready to commit themselves to a full-length graduate program, as well as those who already hold a graduate degree but want to pursue additional work in the same or another field, may find that a certificate provides the perfect alternative.

Students applying to the Graduate School to enter a graduate certificate program must complete the Graduate School application form and submit official transcripts showing completion of the undergraduate/baccalaureate degree and two letters of recommendation.

See the Academic Policies section of the catalog for a complete description of the options, regulations, and requirements for study and completion of a Graduate Certificate.

### Fire/Arson Investigation Certificate

**Advisor:** Robert E. Massicotte, Jr., Assistant Professor, MS, University of New Haven

The certificate in Fire/Arson Investigation is designed to assist professionals who wish to acquire specific skills in this specialized field. The following four courses, or substitutions approved by the advisor, are required for completion of this certificate.

| | |
|---|---|
| FS 625 | Chemistry of Fires and Explosions |
| FS 649 | Fire Scene Investigation and Arson Analysis (4 credits) |

| | | |
|---|---|---|
| FS | 650 | Arson for Profit |
| FS | 665 | Legal Aspects of Fire/Arson Investigation |

**Total credits: 12-13**

## Fire Science Technology Certificate

**Advisor:** Robert E. Massicotte, Jr., Assistant Professor, MS, University of New Haven

The certificate in fire science technology is designed to assist professionals who wish to acquire specific skills related to this specialized field. This certificate is appropriate for those in both the public and the private sectors who are involved in fire/life safety and property protection. The following four courses, or substitutions approved by the advisor, are required for completion of this certificate.

| | | |
|---|---|---|
| FS | 625 | Chemistry of Fires and Explosions |
| FS | 666 | Industrial Fire Protection |
| FS | 667 | Fire and Building Codes, Standards, and Practices |
| FS | 669 | Dynamics, Evaluation, and Prevention of Structural Fires |

**Total credits: 12**

## Forensic Computer Investigation Certificate

**Advisor:** Dean Thomas A. Johnson, Professor, DCrim, University of California, Berkeley

This certificate is designed for those professionals who wish to enhance their knowledge and skills in forensic computer investigation. Courses will be selected with the advisor to satisfy the student's professional interests.

| | | |
|---|---|---|
| CJ | 600 | Computer Crime: Legal Issues and Investigative Procedures |
| CJ | 604 | Network Security, Data Protection, and Telecommunication |

*Plus two of the following:*

| | | |
|---|---|---|
| CJ | 602 | Computers, Technology, and National Security Information Management Systems |
| CJ | 603 | Internet Vulnerabilities and Criminal Activity |
| CJ | 608 | Law and Evidence |
| FOR | 616 | Advanced Crime Scene Investigation |
| FOR | 632 | Advanced Investigation I |
| FOR | 633 | Advanced Investigation II |
| CJ | 651 | Criminal Procedure |
| FOR | 670 | Selected Topics |

**Total credits: 12**

In addition to the main campus in West Haven, study for the graduate certificate in Forensic Computer Investigation is available at the UNH site in Sacramento, California.

## Forensic Psychology Certificate

**Advisor:** James J. Cassidy, Associate Professor, PhD, Hahnemann University; JD, Villanova University School of Law

This is a concentrated program of study designed to prepare those who will be responsible for the management and care of offenders in forensic settings. In addition, it is designed to enhance the knowledge and skills of professionals currently working in law enforcement, courts, corrections, or mental health settings and is also intended to enhance the knowledge base of students in the MA Community Psychology, and MS Criminal Justice programs. Prerequisites: CJ 601 and CJ 605 or equivalent.

| | | |
|---|---|---|
| CJ | 623 | Mental Health Law |
| CJ | 646/P 656 | Abnormal Psychology in Forensic Populations |
| CJ | 647/P 657 | Forensic Assessment and Outcome Evaluation |
| CJ | 648/P 658 | Forensic Treatment Models |

**Total credits: 12**

## Forensic Science/Advanced Investigation Certificate

**Advisor:** Timothy M. Palmbach, Associate Professor, MS, University of New Haven; JD, University of Connecticut

| | | |
|---|---|---|
| FOR | 614 | Survey of Forensic Science |
| FOR | 616 | Advanced Crime Scene Investigation |
| FOR | 632 | Advanced Investigation I |
| FOR | 633 | Advanced Investigation II |

*Plus two of the following:*

| | |
|---|---|
| CJ 608 | Law and Evidence |
| CJ 610 | Administration of Justice |
| FOR 620 | Advanced Criminalistics I |
| FOR 640 | Advanced Criminalistics II |
| FOR 653 | Physical Analysis in Forensic Science |
| FOR 661 | Medicolegal Investigation and Identification |
| FOR 673 | Biomedical Methods in Forensic Science |
| PS 605 | Criminal Law |

**Total credits: 18**

## Forensic Science/Criminalistics Certificate

Advisor: Carol Scherczinger, Associate Professor, BA, Cornell University; PhD, University of Connecticut

Admission to this certificate is limited. Please see advisor early.

| | |
|---|---|
| FOR 620 | Advanced Criminalistics I |
| FOR 621 | Advanced Criminalistics I Laboratory (1 credit) |
| FOR 640 | Advanced Criminalistics II |
| FOR 641 | Advanced Criminalistics II Laboratory (1 credit) |
| FOR 653 | Physical Analysis in Forensic Science |
| FOR 654 | Physical Analysis in Forensic Science Laboratory (1 credit) |
| FOR 673 | Biomedical Methods in Forensic Science |
| FOR 674 | Biomedical Methods in Forensic Science Laboratory (1 credit) |

*Plus one of the following:*

| | |
|---|---|
| CH 621 | Chemical Forensic Analysis with Laboratory (4 credits) |
| CH 631 | Advances in Analytic Chemistry |
| CJ 610 | Administration of Justice |
| FOR 614 | Survey of Forensic Science |
| FOR 645 | Drug Chemistry and Identification |

**Total credits: 19-20**

## Forensic Science/Fire Science Certificate

**Advisor:** Carol Scherczinger, Associate Professor, BA, Cornell University; PhD, University of Connecticut

| | |
|---|---|
| FOR 640 | Advanced Criminalistics II |
| CJ 649 | Fire Science Investigation and Arson Analysis (4 credits) |
| FOR 653 | Physical Analysis in Forensic Science |
| FS 665 | Legal Aspects of Fire and Arson Investigation |

*Plus two of the following:*

| | |
|---|---|
| CH 625 | Chemistry of Fires and Explosions |
| FOR 614 | Survey of Forensic Science |
| CJ 667 | Fire and Building Codes, Standards, and Practices |
| CJ 668 | Fire and Casualty Insurance Practices |
| CJ 669 | Dynamics, Evaluation, and Prevention of Structural Fires |
| CJ 684 | Fire/Accident Scene Reconstruction |
| CJ 693 | Criminal Justice Internship I |

**Total credits: 19**

## Information Protection and Security Certificate

**Advisor:** Dean Thomas A. Johnson, Professor, DCrim, University of California, Berkeley

This certificate is designed to prepare individuals for the responsibilities of protecting their agency or corporate information systems. The basics of information systems security as well as the legal issues and cyber-response strategies will be reviewed. Computer gaming simulations as well as online attack and defense techniques will be presented for student assignments. A selection of these certificate courses is offered online. Appropriate computer competency is assumed as prerequisite to these courses.

| | |
|---|---|
| CJ 625 | Information Systems: Threats, Attacks, and Defense |
| CJ 626 | Firewall and Secure Enterprise Computing |

*Plus two of the following, subject to approval of the advisor:*

| | |
|---|---|
| CJ 602 | Computers, Technology, and National Security Information Management Systems |
| CJ 604 | Network Security, Data Protection, and Telecommunication |

| | | |
|---|---|---|
| CJ | 608 | Law and Evidence |
| CJ | 627 | Internet Investigations and Audit-Based Computer Forensics |
| CJ | 628 | Computer Viruses and Malicious Code |
| CJ | 629 | Practical Issues in Cryptography |
| CJ | 651 | Criminal Procedure |

Total credits: 12

## National Security Certificate

**Advisor:** Dean Thomas A. Johnson, Professor, DCrim, University of California, Berkeley

For students who may not be ready to commit to a full-length graduate program, or for those who already hold a master's degree but wish to pursue additional work in the area of national security, the graduate certificate provides an alternative. Application for the graduate certificate requires the Dean's approval.

**Required Courses**

| | |
|---|---|
| NSP 601 | National Security Programs: Architecture and Mission |
| NSP 602 | Personnel Security Programs |
| NSP 604 | Securing National Security Information Systems |
| NSP 612 | Integrated Studies in Safeguards and Countermeasure Designs |

Total credits: 12

## National Security Administration Certificate

**Advisor:** James O. Matschulat, Professor (Visiting), MBA, St. John's University

To achieve and sustain high performance during these challenging times, our national security enterprise requires focus, discipline, and imagination. It also requires thoughtful oversight, visionary leadership, and highly effective administration.

The purpose of the certificate in National Security Administration is to provide students and security professionals with the opportunity to expand their knowledge and administrative skills with the expectation that graduates of this program will meaningfully contribute to more focused risk management, wise decision-making, and effective administration within our national security enterprise.

**Required Courses**

| | |
|---|---|
| NSP 630 | Risk Assessment and Management in National Security |
| NSP 646 | The Structure of National Security Decisions |
| NSP 647 | The Economics of National Security |
| NSP 648 | Achieving Excellence in National Security Administration |

Total credits: 12

## National Security Technology Certificate

**Advisor:** Dean Thomas A. Johnson, Professor, DCrim, University of California, Berkley

The purpose of the certificate in National Security Technology is to provide students and security professionals with the opportunity to expand their knowledge and technology skills.

**Required Courses**

| | |
|---|---|
| NSP 603 | National Security Charter, Legal Issues, and Executive Orders (3 credits) |
| NSP 620 | Bioterrorism & Biodefense (1 credit) |
| NSP 621 | National Security Incident Mapping (2 credits) |
| NSP 645 | National Security: Issues in Deception (3 credits) |
| CJ 680 | Research Issues in Cyberterrorism (3 credits) |

Total Credits: 12

## Public Safety Management Certificate

**Advisor:** Robert E. Massicotte, Jr., Assistant Professor, MS, University of New Haven

This certificate in public safety management is designed to assist professionals who wish to acquire specific skills related to this field. Courses emphasize the application of modern management principles and practices to the field of public safety. The following four courses, or substitutions approved by the advisor, are required for completion of this certificate.

| | | |
|---|---|---|
| FS | 631 | Organization and Management of Public Fire Protection |
| FS | 632 | Strategic Planning for the Fire Service |
| FS | 633 | Issues in Public Safety Professional Responsibility |
| FS | 634 | Issues in Public Safety Management |

Total credits: 12

One of the following electives may be substituted for one of the above required courses, with the approval of the advisor.

| | | |
|---|---|---|
| CO | 631 | Public Information Dynamics |
| EC | 665 | Urban and Regional Economic Development |
| FS | 681 | Seminar/Research Project in Public Safety Management I |
| FS | 682 | Seminar/Research Project in Public Safety Management II |
| FS | 683 | Seminar/Research Project on Comparative Public Safety Systems |
| PA | 620 | Personnel Administration and Collective Bargaining in the Public Sector |
| PA | 630 | Fiscal Management for Local Government |
| PS | 635 | Law and Public Health |
| SH | 602 | Safety Organization and Administration |
| SH | 620 | Occupational Safety and Health Law |

## Victim Advocacy and Services Management Certificate

Advisor: Mario T. Gaboury, Professor, PhD, Pennsylvania State University; JD, Georgetown University Law Center

This certificate is designed for professionals who work with crime victims. Students will develop advanced knowledge and skill in working as victim advocates and victim services managers.

| | | |
|---|---|---|
| CJ | 617 | Advanced Victimology |
| CJ | 618 | Crime Victims' Righrs and Services |

*Plus two of the following:*

| | | |
|---|---|---|
| CJ | 601 | Mental Health, Law, and Criminal Justice |
| CJ | 605 | Theories of Criminal Behavior |
| CJ | 606 | Domestic and Sexual Violence |
| CJ | 624 | Group Process in Criminal Justice |
| P | 605 | Survey of Community Psychology |
| P | 610 | Program Evaluation |
| P | 611 | Individual Intervention Seminar |
| P | 625 | Life Span Developmental Psychology |
| P | 628 | The Interview |
| P | 629 | Introduction to Psychotherapy and Counseling |
| P | 632 | Group Treatment and Family Therapy |
| P | 636 | Abnormal Psychology |
| PA | 601 | Principles of Public Administration |
| PA | 604 | Communities and Social Change |
| PA | 630 | Fiscal Management for Local Government |

Total credits: 12

# COURSE DESCRIPTIONS

Course descriptions are arranged alphabetically by the course prefix code letters, as listed here. For the purpose of brevity, course descriptions may consist of sentence fragments. Unless otherwise specified, all graduate courses carry three credit hours.

**A**

| | |
|---|---|
| A | Accounting and Taxation |
| AR | Arabic |

**B**

| | |
|---|---|
| BI | Biology |

**C**

| | |
|---|---|
| CE | Civil and Environmental Engineering |
| CH | Chemistry |
| CJ | Criminal Justice |
| CM | Chemical Engineering |
| CO | Communication |
| CS | Computer Science |

**E**

| | |
|---|---|
| E | English |
| EC | Economics |
| ED | Education |
| EE | Electrical and Computer Engineering |
| EM | Engineering Management |
| EN | Environmental Science |
| ES | Engineering Science |
| EXID | Executive MBA |
| EXIE | Executive Engineering Management |

**F**

| | |
|---|---|
| FI | Finance |
| FOR | Forensic Science |
| FS | Fire Science |

**H**

| | |
|---|---|
| HS | History |
| HU | Humanities |

**I**

| | |
|---|---|
| IB | International Business |
| IE | Industrial Engineering |

**L**

| | |
|---|---|
| LA | Law |
| LG | Logistics |

**M**

| | |
|---|---|
| M | Mathematics |
| MB | Molecular Biology |
| ME | Mechanical Engineering |
| MG | Management |
| MK | Marketing |

**N**

| | |
|---|---|
| NSP | National Security and Public Safety |
| NU | Nutrition |

**P**

| | |
|---|---|
| P | Psychology |
| PA | Public Administration/ Health Care |
| PH | Physics |
| PL | Philosophy |
| PS | Political Science |

**Q**

| | |
|---|---|
| QA | Quantitative Analysis |

**S**

| | |
|---|---|
| SH | Occupational Safety |
| SO | Sociology |

**T**

| | |
|---|---|
| THM | Tourism and Hospitality |

# Accounting and Taxation

### A 601 Federal Income Taxation I

A study of tax policy and the fundamental principles of the federal income tax law taught at an advanced level of inquiry. Coverage entails the key concepts of gross income, adjusted gross income, deductions, exemptions, credits, and special tax computations, with attention given to the provisions of the Internal Revenue Code affecting individual taxpayers.

### A 602 Federal Income Taxation II

A continuation of Federal Income Taxation I emphasizing the fundamental principles concerning dispositions of property: analysis of basis, recognition of gain or loss, capital asset transactions, nonrecognition exchanges and depreciation recapture; inventory methods, changes in accounting periods, and accounting methods.

### A 603 Tax Research and Writing

Tax Research sources, techniques, practice and writing. Use of web-based Tax Research Services and evaluation of weights or authority, legislative history, and systematic written analysis of tax problems and legal memoranda. 2 ctedits

### A 604 Taxation of Business Entities

An introduction to the income tax consequences of the formation and operation of regular C corporations, S corporations, affiliated corporations, patnerships, and limited liability companies.

### A 605 Partnership and Limited Liability Company Income Taxation

Prerequisite: A 604. A study of the federal income tax problems encountered in the operation of partnerships and limited liabilities companies, including partnership allocations, operating distributions, sale of partnership interest, withdrawal of a partner, death or retirement of a partner, distribution of partnership assets, and basis adjustments.

### A 606 Corporate Income Taxation

Prerequisite: A 604 or undergraduate equivalent. Advanced study in the corporate tax area including corporate distributions, redemptions, liquidations, taxable acquisitions, carryover of corporate tax attributes, corporate reorganizations and divisions, intercompany transactions, and consolidated returns.

### A 607 Qualified Retirement Plans

An examination of the fundamentals of the federal taxation of deferred compensation. The course will focus on qualified retirement plans and individual and self-employed retirement plans as developed by the Employment Retirement Income Security Act of 1974 and subsequent legislation. Deferred executive compensation arrangements, stock options, restricted property, tax deferred annuities, and various employee benefit plans will also be reviewed.

### A 608 Taxation of Estates, Gifts, and Trusts

A comprehensive introduction to, and analysis of, the federal estate and gift tax laws including basic principles of estate planning. Coverage also includes federal income taxation of estates, trusts, grantors, and beneficiaries.

### A 609 Federal Tax Practice and Procedure

A study of the history and organization of the Internal Revenue Service, the selection of returns for audit, and the review steps at the administrative level. Code provisions covered will include filing requirements, statutoty notices, restriction on assessment, statute of limitations, refund procedures, waivers, closing agreements, protests, and rulings.

### A 610 International Taxation

Prerequisite: A 604. Consideration of the federal income tax treatment of nonresident aliens, foreign corporations, and the foreign income of U.S. residents and domestic corporations; comparison of alternative methods of engaging in operations abroad; foreign tax credit; allocations under code Section 482; Section 367 rulings; effect of tax treaties.

### A 611 State and Local Taxation

Tax problems encountered at the state and local level by businesses engaged in interstate commerce. Federal limitations on the taxation of multistate enterprises and jurisdictional problems are examined. Specific areas covered are license to do business, net income, franchise, gross receipts, property, and sales and use taxes. Apportionment problems are examined in detail.

### A 615 Research Project in Federal Income Taxation

Prerequisite: 15 graduate hours in taxation. A study of the techniques and tools of tax research. Reference sources include tax loose-leaf services, IRS cumulative bulletins, court cases, congressional committee reports, textbooks, published articles.

Research projects will be assigned for written submission. 1 credit

**A 616 Taxation for Management**
Introduction to federal taxation and its impact on business decision making. Overview of the basics of federal taxation, its traps, and tax planning opportunities. Complete overview of all areas of federal taxation to understand tax planning for personal and business situations and the interrelationship of tax planning decisions. Areas of federal taxation covered are individual income taxes, corporation income taxes, S corporations, partnerships, income taxation of estates and trusts, estate and gift taxes. Not open to MS in Taxation program students.

**A 620 Financial Accounting for Managers**
An examination of financial accounting reports, standards, practices, and procedures from a user's perspective, emphasizing the understanding and use of accounting reports rather than their preparation. Basic terms, concepts, reports, and underlying theories are covered. A review of the effects of choosing certain accounting methods, policies, and procedures is intended to enhance the manager's comprehension of financial statement presentation.

**A 621 Managerial Accounting**
Prerequisite: A 620. Accounting analysis for the managerial functions of planning, controlling, and evaluating the performance of the business firm.

**A 630 Topics in Corporate Financial Reporting**
Prerequisite: A 620 or equivalent. A selected examination of corporate financial accounting topics including revenue recognition, current assets, investments, leases, pensions, earnings per share, foreign currency translation, and business combinations.

**A 641 Accounting Information Systems**
Prerequisite: A 621. An examination of the function and limitations of internal accounting information systems and their relationship to other decision-oriented business information systems.

**A 642 Internal Auditing Seminar**
Prerequisite: A 621. Analysis of the principles underlying the functions of auditing within a firm. Will impart a working knowledge of techniques used in business audits.

**A 650 Advanced Accounting Theory**
Prerequisite: A 630 or six hours of intermediate accounting. Theoretical aspects of accepted accounting principles and their significance as a frame of reference for the valuation of accounting practices. Major focus on the role of regulatory agencies and professional accounting organizations with regard to their influences on accounting theory and practice.

**A 652 Auditing and Assurance Services Seminar**
An analysis of the contemporary problems surrounding the attest function performed by the professional independent auditor.

**A 654 Financial Statements: Reporting and Analysis**
Prerequisite: A 621. Techniques in analyzing financial statements by creditors and equity investors for the short and long term. Review of accounting principles as reflected in the financial statements.

**A 661 Managerial Accounting Seminar**
Prerequisite: A 621. Case course covering advanced issues of management accounting. Develops topics introduced in A 621.

**A 670 Selected Topics**
A study of selected issues of particular interest to students and instructor. Course may be taken more than once.

**A 690 Research Project**
Prerequisite: 15 graduate hours or permission of the instructor. Independent study under the supervision of an advisor.

**A 695 Independent Study I**
A planned program of individual study under the supervision of a member of the faculty.

**A 696 Independent Study II**
A continuation of Independent Study I.

## Arabic

**AR 601 Elementary Arabic I**
This course will introduce students to the basic skills of reading, writing, speaking and listening in Modern Standard Arabic. Students will learn Arabic letters and sounds, write and create words and sentences, and be able to conduct basic conversations in the Arabic language.

**AR 602 Elementary Arabic II**
Prerequisite: AR 601 or permission of the instructor. This course will build upon the language, listening, and writing skills students developed in AR 601. Students will advance their knowledge of Arabic letters and sounds, words and sentences, and basic conversation skills.

## Biology

**BI 605 Biostatistics**
A non-calculus-based course which includes basic concepts of probability and statistics. These concepts are applied to problems in human biology, industrial/occupational health, and epidemiology. Introduction to and use of the computer package SPSSx for data analysis. (See also M 605.)

# Civil and Environmental Engineering

### CE 601 Physical-Chemical Treatment of Aqueous Wastes

Analysis of physical and chemical processes in natural and engineered systems for water pollution control. Unit processes covered include, but are not limited to, aeration and gas transfer, sedimentation, filtration, coagulation/flocculation, adsorption, chemical stabilization, ion exchange, disinfection. Design methodologies and operational aspects of treatment are also considered.

### CE 602 Biological Treatment of Aqueous Wastes

This course provides an in-depth study of principles of biological treatment of aquatic wastes (municipal, industrial, and/or hazardous). Suspended and attached growth processes commonly in use are covered. Emphasis is given to design and operational aspects of activated sludge, trickling filters, and rotating biocontactors. On-site treatment processes are also covered.

### CE 603 Contaminant Fate and Transport in the Environment

This course covers the fundamental principles of contaminant behavior in the environment. Contaminant physical-chemical properties, transport, and transformation mechanisms affecting contaminant distribution among air, water, and solid domains are studied in depth. Topics covered include, but are not limited to, environmental interface equilibria; advective and diffusional transport; biochemical exchange in atmospheric, aquatic, and terrestrial domains. Environmental modeling is also considered.

### CE 605 Solid Waste Management

Characteristics, volumes, collection, and disposal of solid waste and refuse. Design of processing, recycling, and recovery equipment; landfill design and operation; resource recovery; incineration.

### CE 606 Environmental Law and Legislation

Review of techniques of enforcement of state and federal pollution control laws and regulations; effects on waste treatment criteria and design and evaluation of municipal ordinances; preparation of environmental assessments and impact statements.

### CE 607 Water Pollution Control Processes

Prerequisite: CH 601. This course is open to non-engineering students only. Study of physical, chemical, and biological processes employed for pollution control. Processes cover the removal of suspended, colloidal, and dissolved phases of pollution.

### CE 610 Pollution Prevention Management Technologies

The first half of this course focuses on methods to implement a pollution prevention hierarchy, developing management support, identifying pollution prevention opportunities, assembling a pollution-prevention team, and developing economic justification for potential opportunities. The second half of the course focuses on various technologies available for a wide variety of pollutants, including a review of methods that can be used to integrate the technologies within processes of existing facilities.

### CE 612 Advanced Wastewater Treatment

Prerequisite: CE 602. Theories and principles of advanced sewage treatment including nutrient removal, demineralization, distillation, ozonization, carbon filtration, ion exchange, nitrification; design of facilities; upgrading secondary plants.

### CE 613 Industrial Wastewater Control

Prerequisites: CE 601, CE 602. Characteristics of industrial wastes: volumes, sources, types; methods of volume reduction; waste segregation; recovery, recycling, and waste treatment.

### CE 614 Surface Water Quality Management

Prerequisite: CE 620. Determination of controls that must be instituted to achieve specific water quality objectives. Waste load allocation as principal management tool, requiring knowledge of response of a system to waste load inputs. Input/response relationships for three different surface water systems: rivers and streams, lakes, estuaries. Related topics: dissolved oxygen analysis, indicator bacteria, and eutrophication.

### CE 615 Groundwater Hydrology

Prerequisites: undergraduate courses in fluid mechanics and soil mechanics. Study of fundamental principles governing fluid flow in porous and fractured media, provides necessary foundation for advanced studies in hydrogeology and contaminant hydrology. Includes Darcy's law, the continuity equation, aquifers, flow in the saturated zone, flow nets, wells and well hydraulics, flow in fractures, flow in the unsaturated zone, groundwater modeling.

### CE 616 Contaminant Hydrology

Prerequisite: CE 615. Behavior of contaminants in the subsurface. Emphasis on physical, chemical, and biological processes that determine fate of a contaminant: advection, diffusion, adsorption, mechanical dispersion,

bio-chemical reactions. Quantitative relationships for predictive framework. Applications include site characterization, remediation, wellhead protection, flow and transport modeling, groundwater waste disposal.

### CE 617 Wastewater Residuals Management

Prerequisites: CE 601 and CE 602 or permission of instructor. An overview of rules and regulations affecting treatment and disposal of wastewater residuals. Quantitative and qualitative characteristics are considered. Treatment processes for preliminary operations, thickening, chemical/biological stabilization, conditioning, disinfection, dewatering, drying, thermal reduction, and ultimate disposal are covered extensively, and design procedures are outlined. Case studies address beneficial use of wastewater residuals.

### CE 618 Hazardous Waste Treatment

Prerequisites: CE 601 and 602, or permission of instructor. A review of the historical, legislative, and social framework of hazardous waste issues. Physical, chemical, biological, and thermal processes used for decontamination of hazardous wastes and hazardous waste sites are studied extensively. Specific remedial in-situ/ex-situ technologies such as soil vapor extraction, soil washing, incineration, bioremediation, immobilization, and chemical extraction are covered. Includes various laboratory and field case studies.

### CE 620 Engineering Hydrology

Prerequisites: undergraduate course in hydraulics; computer literacy. Theory, methods, and applications of hydrology to contemporary engineering problems. Methods of data collection and analysis as well as design procedures are presented for typical engineering problems. Specific topics to be considered within this framework include the rainfall/runoff process, hydrograph analysis, hydrologic routing, urban runoff, storm water models, and flood frequency analysis.

### CE 621 Advanced Hydrology

Prerequisite: CE 620. Examination of water sources and losses; the evaporation and infiltration processes and their effects on stream flow hydrographs. Deterministic and stochastic methods of reservoir analysis and design for purposes of flood protection and water conservation will be investigated, as well as problems in urban hydrology.

### CE 623 Open Channel Hydraulics

Prerequisite: undergraduate course in hydraulics. Basic theories of open channel flow will be presented and corresponding equations developed. Methods of calculating uniform/steady flow; gradually varied flow; and rapid, spatially varied, unsteady flow will be investigated. Flow through bridge piers, transitions, and culverts; backwater curves and the design of open channels.

### CE 624 Computer Applications in Hydrology/Hydraulics

Prerequisites: CE 620 and CE 623. Investigation of widely used computer software in the areas of hydrology and hydraulics. The theory underlying the programs as well as application and evaluation of software will be stressed.

### CE 629 Wood Engineering I

Prerequisites: a structural analysis course and a structural design course. Course may not be taken for credit by students who have completed the undergraduate equivalent. Study of the growth and structure of wood and how these influence wood strength, durability, preservation, and fire protection. Analysis and design of structural members of wood using Allowable Stress Design (ASD) method including beams, columns, and connections; design of wood structures. Laboratory experiments included.

### CE 630 Reinforced Concrete Design

Prerequisite: undergraduate course in concrete design and construction. Advanced topics including deep beams, slabs, composite beams, beam columns, stability, connections, creep and deflection control.

### CE 631 Structural Steel Design

Prerequisite: undergraduate course in steel design and construction. Advanced topics related to the behavior and design of rigid frames (single and multistory), plate girders, and connections.

### CE 633 Wood Engineering II

Prerequisite: CE 629, or undergraduate course in wood engineering. Wood properties and determination of allowable stresses. Laminated, built-up, and composite sections. Wood framing systems and connections to resist gravity and lateral loads.

### CE 634 Prestressed Concrete Design

Prerequisite: undergraduate course in concrete design and construction. Analysis and design of pre-tensioned and post-tensioned concrete structures. Beams, columns, connections, partial prestressing, deflections, anchorage.

### CE 640 Structural Analysis

Prerequisite: undergraduate course in indeterminate structures. Analysis of structures having members with variable cross sections, secondary stresses, shear walls, and semirigid connections. Influence lines for statically indeterminate structures.

**CE 650 Soil Mechanics I**
Prerequisites: undergraduate course in soil mechanics; computer literacy. The first in a series of courses dealing with soil mechanics and foundation engineering. Gives the student a better understanding of the basic principles of geomechanics. Includes the nature of soil; soil formation; phase relationships and classification; stress, strain, and strength analysis; flow analysis; and consolidation theory.

**CE 651 Soil Mechanics II**
Prerequisite: CE 650. Second course in the soil mechanics series. Includes consolidation theory, settlement analysis, soil modification, compaction, lateral earth pressure, slope stability, and soil exploration.

**CE 652 Foundation Engineering I**
Prerequisite: CE 651. Deals primarily with shallow foundations. Includes types of foundations, site exploration, shear strength, bearing capacity, limit states, settlement, allowable pressure, and rafts and mats.

**CE 653 Foundation Engineering II**
Prerequisite: CE 652. Deals primarily with deep foundations. Topics include pile foundations, pile types, pile driving, load testing, design of individual piles, group action, drilled pier foundations, construction methods and capacity in sand and clay.

**CE 660 Project Planning**
Application of network analogy to project planning and scheduling; resource, time, and financial management. Computer applications will be included.

**CE 661 Air Pollution Fundamentals**
An introduction to the sources of air pollution, transport of gaseous and particulate pollutants in the atmosphere on local and global scales, transformations of pollutants by atmospheric processes, impact of airborne pollutants on the environment, control of sources of air pollution, and legislative mandates. Introduction to meteorological concepts and computer transport models. Current issues such as ozone depletion and global warming will also be discussed. (See also CM 621.)

**CE 670 Selected Topics**
A study of relevent topics of particular interest to students and instructor. Course may be taken more than once.

**CE 678 Computer Applications in Civil Engineering**
Prerequisite: introductory course in computer fundamentals. The design and analysis of software and hardware systems for the solution of civil engineering problems. Includes software engineering, software coding, evaluation of hardware and software.

**CE 690 Research Project**
Prerequisites: 18 graduate hours or permission of the department chair and program coordinator. Independent study under the guidance of an advisor in an area of mutual interest, each study terminating in a technical report of academic merit. Research may be in such environmental areas as water resources, stream pollution, solid waste management, and air pollution.

**CE 695 Independent Study I**
Prerequisite: permission of program coordinator. Independent study under the guidance of an advisor in an area designated by the program coordinator.

**CE 696 Independent Study II**
A continuation of Independent Study I.

**CE 698 Thesis I**
Prerequisites: 15 graduate hours. Periodic meetings and discussions of the individual student's progress in the preparation of a thesis.

**CE 699 Thesis II**
A continuation of Thesis I.

## Chemistry

**CH 600 Introduction to Environmental Chemistry**
Prerequisite: one year of undergraduate general chemistry. Designed as a prerequisite for CH 601 for students who have one year of undergraduate general chemistry but lack organic chemistry. Review of general and introductory organic chemistry, with examples taken from topics of environmental concern including discussion of pollutants, toxicology, and some environmental analytic methods.

**CH 601 Environmental Chemistry**
Prerequisites: one year of undergraduate general chemistry, plus one semester of organic chemistry or CH 600. Areas of consideration: the sources, reactions, transport, effects, and fates of chemical species in water, soil, and air environments, as well as the influence of human activities on these processes.

**CH 602 Environmental Chemical Analysis**
Prerequisite: CH 601 or equivalent. Theory and laboratory training in the applications of instrumental methods in the analysis of environmental samples. Topics include sampling techniques; chromatography; ultraviolet-visible, infrared, and atomic absorption spectroscopy; mass spectrometry; nuclear magnetic resonance spectrometry; biochemical methods and use of radioisotopes.

### CH 605 Organic Reaction Mechanisms

Prerequisite: one year of undergraduate organic chemistry. This course deals with the structure and mechanisms of organic reactions, including stereochemistry and conformational analysis, acid-base catalysis, substitution, addition, and elimination reactions, as well as concerted reactions.

### CH 606 Modern Organic Synthetic Methods

Prerequisite: CH 605 or equivalent or consent of instructor. A survey and discussion of methods. Some of the topics covered are synthetic strategies, including computer-generated strategies, asymmetric syntheses, oxidation, reduction, stereocontrol and ring formation, protecting groups, nucleophilic and electrophilic species that form carbon-carbon bonds, and some complex molecules.

### CH 611 Special Topics in Advanced Organic Chemistry

Advanced course dealing with topics such as stereochemistry, photochemistry, natural products, and mechanisms of organic reactions.

### CH 612 Molecular Structure Determination

Prerequisites: Evidence of mastery of the concepts of Organic Chemistry and of proficiency in the basic Spectroscopies. Equivalent UNH prerequisite courses are CH202 Organic Chemistry and CH221 Instrumental Methods of Analysis. This course focuses on the use of NMR methods and mass spectral data to elucidate structures of small to medium size organic molecules, with an emphasis on pharmacologically active compounds and synthetic intermediates. Extensive interpretation of NMR data obtained for routine active nuclei in single and multidimensional experiments. Methods will include 1H mapping, COSY, NOE, 13C DEPT series, and other modern experiments. Utilization of low- and high-resolution mass spectral data will accompany explanations of the processes for the selection of a method of acquisition to be used to obtain structure information. Discussion of various sample introduction methods: LC, GC, DIP, maldi, and ionization techniques. The course also includes a review of the supporting spectroscopies and x-ray crystallography to culminate in developing an understanding of chemical structure determination as relevant to molecular structure identification and mixture evaluation.

### CH 621 Chemical Forensic Analysis with Laboratory

Advanced techniques and new developments in the identification of various materials such as pigments, dyestuffs, food additives, pharmaceutical preparations, polymers, synthetic fibers, and inorganic material products. 4 credits

### CH 625 Chemistry of Fires and Explosions

An examination of the basic organic chemistry and combustion and explosive properties of flammable materials. The chemical principles underlying fires and explosions. Chemical properties of various synthetic materials and the products of their combustion. Fire-retardant materials and chemicals used in fire extinguishment. (See also FS 625.)

### CH 631 Advances in Analytic Chemistry

Provides background on the recent advances made in instrumentation and current analytic techniques.

### CH 640 Chemical Separations

Prerequisites: Evidence of mastery of the concepts of chemistry as demonstrated with a BS degree in chemistry or biology. Students should have courses equivalent to UNH courses CH202 Organic Chemistry and CH221 Instrumemental Methods of Analysis. Biological systems contain many thousands of different organic compounds that are present at very low concentrations. This course deals with current methods of separating, detecting, and quantifying pharmaceuticals and associated metabolites and other "small molecule" organic agents present in complex animal and agricultural samples. Clean-up methods include liquid and solid phase extractions, gel filtration, size-exclusion, ion-exchange, and affinity chromatography. Analytical methods emphasize HPLC, GC with MS and fluorescence detection, and detection-oriented derivatization. Comparison and evaluation of different techniques are presented with practical examples.

### CH 650 Medicinal Chemistry

Prerequisite: one year of undergraduate organic chemistry. Recommended: an advanced undergraduate organic chemistry course. Medicinal chemistry is the investigation, discovery, and development of therapeutic agents. A key concept is the understanding of the relationship between chemical structure and drug activity. This course is interdisciplinary in its approach, with the goals of understanding drug action and designing new drugs. Medicinal chemistry incorporates knowledge of a wide scope of disciplines, such as chemistry, biology, and pharmacology. This course emphasizes the fundamental principles of medicinal chemistry and surveys major classes of drugs.

### CH 655 Pharmacology

Prerequisites: one year of undergraduate organic chemistry and one term of biochemistry. Recommended: an advanced undergraduate organic chemistry course, at least one graduate course in biochemistry (MB601-MB603), and a graduate course in cell

biology (MB607). Pharmacology is the study of therapeutics, agents administered to achieve a beneficial therapeutic effect on some disease process. This survey course will cover a general overview of pharmacology including principles of pharmacodynamics (mechanism of action of drugs) and pharmacokinetics (the role of drug absorption, distribution, metabolism, and excretion in drug action). The general concepts will be applied to case studies of specific drugs taken from the main classes of therapeutic agents.

### CH 665 Combinatorial Chemistry

Prerequisites: CH 650 Medicinal Chemistry and CH 606 Modern Organic Synthetic Methods. Students are expected to have a strong undergraduate background in organic chemistry. Combinatorial chemistry is a relatively new approach for producing large collections of compounds for analysis. This course will cover the fundamental techniques and ideas for generating diverse libraries of compounds. Students will learn and utilize several computer packages to design, analyze, and evaluate combinatorial libraries. Examples will be drawn principally from drug design since combinatorial chemistry has had a major impact on the development of new pharmacological agents. Students anticipating careers in pharmaceutical or biotechnology industries will find this course of value.

### CH 670 Selected Topics

A study of selected issues of particular interest to the students and instructor. May be taken more than once.

### CH 680 Graduate Seminar I

Prerequisite: Permission of the instructor. Weekly discussions of current topics in medicinal chemistry and presentations of student and faculty research projects. 1 credit

### CH 681 Graduate Seminar II

Prerequisites: CH 680 Graduate Seminar I, E659 Writing and Speaking for Professionals, and permission of the instructor. Weekly discussions and seminars on current topics in medicinal chemistry will be presented by students and faculty. Students will make a formal presentation of their research. 1 credit

### CH 695 Independent Study I

A planned program of individual study under the supervision of a member of the faculty.

### CH 696 Independent Study II

A continuation of Independent Study I.

### CH 698 Thesis I

Prerequisite: completion of 15 credits of graduate work. Periodic meetings and discussion of the individual student's progress in the preparation of a thesis.

### CH 699 Thesis II

A continuation of Thesis I.

## Criminal Justice

### CJ 600 Computer Crime: Legal Issues and Investigation Procedures

An overview of computer crime and the procedures forensic computing specialists, law enforcement investigators, and prosecutors must invoke to prosecute computer criminals successfully.

### CJ 601 Mental Health, Law, and Criminal Justice

Basic psychological theory and specific applications in the criminal justice system will be explored. Particular emphasis is placed on mental health issues as they affect the criminal justice system.

### CJ 602 Computers, Technology, and National Security Information Management Systems

An introduction to information systems used within our national security system. A framework is provided for understanding the needs, types, capabilities, and applications of management information systems. An overview of existing national security information systems is presented with implications for future needs. Finally, the impact of science and technology upon our national security agencies and how information management systems will prepare us for 21st century challenges will also be analyzed.

### CJ 603 Internet Vulnerabilities and Criminal Activity

This course provides appropriate strategies for the proper documentation, preparation, and presentation of investigations involving the Internet and familiarizes students with legal information which impacts Internet investigations.

### CJ 604 Network Security, Data Protection, and Telecommunications

A comprehensive introduction to network security issues, concepts, and technologies. The core technologies of access control, cryptography, digital signatures, authentication, network firewalls, and network security services are reviewed. Issues of security policy and risk management are considered.

### CJ 605 Theories of Criminal Behavior

A survey of theories relating to the scope and nature of the crime problem. Consideration of the problems of deviancy including social norms deviancy, mental disturbances, juvenile crime, and the various possible and actual responses to deviancy. Various approaches to the problem of rehabilitation.

### CJ 606 Domestic and Sexual Violence

An in-depth analysis of the typologies, causes, correlates, dynamics, and effects of domestic and sexual violence and victimization. A review of treatment practices in these areas will be provided.

### CJ 607 Psychological Applications in Criminal Justice

Prerequisite: CJ 601 or permission of instructor. This course will explore psychological theory and research in relation to specific problems in criminal justice. Assumptions underlying behavior analysis in criminal investigation and profiling, eyewitness testimony, jury selection, violence prediction, risk assessment, personnel screening, and children as victims will be examined. Students will be expected to develop an application in a specific area of expertise using class and textual content as a base.

### CJ 608 Law and Evidence

Comprehensive study of the rules of evidence, particularly as applied to physical evidence. Includes judicial notice, presumptions, hearsay rules, confessions, admissions, scientific evidence, and expert testimony. Emphasis on criminal law applications.

### CJ 609 Social and Structural Models of Crime

Prerequisite: CJ 605. This course is part of a package of courses focused on criminal behavior that are part of the new PhD in Criminal Justice.

### CJ 610 Administration of Justice

A study of all the steps of the criminal justice system, from the time the accused is arrested until sentencing to a correctional facility. The objectives are to review all the problems which arise during this process and to consider some possible solutions which will benefit the individual being processed without subverting the purposes of the process.

### CJ 611 Research Methods in Criminal Justice

An introduction to quantitative and qualitative methods used in criminal justice for research and policy analysis. Students will become familiar with basic types of research designs, survey research methods, and evaluation methods.

### CJ 612 Criminal Justice Management

The development of the theory and practice of criminal justice management in the United States. Significant developments and ideas of those who have made major contributions to American criminal justice management.

### CJ 613 Quantitative Applications in Criminal Justice

Prerequisite: CJ 611. An introduction to quantitative applications in the field. Basic descriptive and inferential statistics. Topics include measurement scales, measures of central tendency, measures of dispersion, data distributions, sampling, probability, hypothesis testing, Chi Square, Z-Test, t-Test, and Analysis of Variance models. Students will also be introduced to the use of SPSS for data analysis.

### CJ 615 Rational Models of Crime

Prerequisite: CJ 605. A survey of rational choice theories of crime from sociology, psychology, economics, and political science perspectives. Topics include deterrence, routine opportunities theory, incapacitation, and conflict approaches to understanding crime and criminal behavior.

### CJ 617 Advanced Victimology

An in-depth analysis of the causes, correlates, dynamics, and aftereffects of criminal victimization on victims of crime and a review of current practices in the area of crime victim assistance.

### CJ 618 Crime Victims' Rights and Services

An analysis of the legal rights of victims of crime at both the state and federal levels and how these laws relate to specific victim advocacy and service-providing programs, with an in-depth treatment of the management and administration of crime victim programs.

### CJ 619 Psychology of Crime

Prerequisites: CJ 601 and CJ 605. A survey of psychological explanations of criminal behavior. Topics include psychoanalytic theories, trait theories, social learning, cognitive learning, bio-social theories, developmental theories of crime, and economic and social psychological theories of criminal behavior.

### CJ 622 Advanced Quantitative Applications in Criminal Justice

Prerequisite: CJ 613 or its equivalent. An introduction to multivariate statistical techniques as applied in criminal justice research. Topics include regression analysis, discriminant analysis, factor analysis, manova, and multivariate significance tests.

### CJ 623 Mental Health Law

Prerequisite: CJ 601. Review of civil and criminal law as it relates to mental health issues. Topics include competence to stand trial, insanity, competence to be executed, civil commitment, sexual predator commitment statutes, confidentiality, duty to warn, and issues of expert testimony. Ethical issues and issues of professional responsibility will be covered. Legal case method pedagogy will be utilized.

### CJ 624 Group Process in Criminal Justice

Small group interaction; both theoretical and experimental facets of group process are presented. Group counseling and encounter groups.

### CJ 625 Information Systems Threats, Attacks, and Defenses

This course provides an overview of the actors, motives, and methods used in the commission of computer-related crimes and describes the methods used by organizations to prevent, detect, and respond to these crimes.

### CJ 626 Firewall and Secure Enterprise Computing

This course covers theory and practices of Internet firewalls and many of the details and vulnerabilities of the IP and embedded protocol sites. In the laboratory and online portion of the course students will construct, deploy, and test a real firewall against common Internet attacks.

### CJ 627 Internet Investigations and Audit-Based Computer Forensics

Theory and techniques of tracking attackers across the Internet and gaining forensic information from computer systems. The course includes case studies of Internet-based crimes and addresses limits of forensic techniques.

### CJ 628 Computer Viruses and Malicious Code

This course addresses theoretical and practical issues surrounding computer viruses.

### CJ 629 Practical Issues in Cryptography

Examples of current historical cryptography and stegonagraphic systems; major types of cryprosystems and cryptanalytic techniques, and how they operate; hands-on experience with current cryptographic technology.

### CJ 630 Investigating Financial Crimes

Study of principles and techniques associated with investigating financial crimes. Emphasis on case study approach to understanding financial crimes investigation.

### CJ 635 Global Perspectives on Crime & Justice

Affords students the opportunity to explore a number of foreign and criminal justice systems with emphasis on policing. Different perspectives of crime problems will be seen through the prism of foreign culture. Specific countries and topics will vary.

### CJ 637 Criminal Justice Policy

Examines the formulation and implementation of criminal justice policy, including an introduction to policy analysis in the criminal justice context.

### CJ 638 Public Policy Analysis in Criminal Justice

Prerequisites: CJ 613 and CJ 637 or their equivalent. An introduction to public policy and program analysis as applied within criminal justice field. Topics include the impact of basic research on policy formulation and implementation. Special attention will be given to issues of decision-making and its tools.

### CJ 642 Computer Forensics: Core Knowledge and Design of Computer Forensic Lab

This course will provide students with a thorough understanding of operations and functions of a computer forensic laboratory. The recovery of digital evidence and certification skills of forensic computer experts will be discussed.

### CJ 646 Abnormal Psychology in Forensic Populations

Prerequisites: Undergraduate or graduate course in Abnormal Psychology, CJ 601, CJ 605. This is an advanced course in mental disorders associated with prisons and other forensic practice. Emphasis is on disorders involving violent and predatory behavior including personality disorders, psychoses, pedophilia, and other sexual paraphilias. Special emphasis on psychopathy, psychopathology, criminal behavior, and Hans Toch's work on psychopathology created in prison settings. Well-known forensic cases will be examined. This course is a prerequisite for all other courses in the Forensic Psychology sequence. (See also P 656.)

### CJ 647 Forensic Assessment and Outcome Evaluation

Prerequisites: CJ 601, CJ 605, and CJ 646. This course will review the spectrum of assessment instruments used in evaluation and treatment in inmate and patient settings. Pros and cons of forensic interviewing will be examined. Emphasis on ability to assess violence and risk will be included. Students will come to understand the strengths and limitations of a wide variety of clinical assessment tools. Special concentration on techniques to assess malingering.

### CJ 648 Forensic Treatment Models

Prerequisites: CJ 601, CJ 605, CJ 646, and CJ 647. This course will examine various mental health treatment modalities, with particular emphasis on treatment for patients/inmates in the forensic system. Psychopharmacology, group therapy, cognitive techniques, community-based management, faith-based approaches, and social skills training will be covered. Treatment of insanity acquittees, incompetent-to-stand-trial patients, inmates, juvenile offenders, psychopaths, and sex offenders will be examined. Management of high-risk forensic populations will be covered.

Particular emphasis will be on current research findings regarding the effectiveness of these approaches with forensic populations. (See also P 658.)

### CJ 649 Fire Scene Investigation and Arson Analysis

The techniques of crime scene documentation and investigation as they relate to fire and explosion scenes. Evidence recognition and collection. Laboratory analysis of fire scene, arson accelerant, and explosion scene residues. Scientific proof of arson. Laboratory fee required. 4 credits (See also FS 649.)

### CJ 650 Death Investigation: Scene to Court

An in-depth study of the principles and techniques associated with investigating homicides; suicides; and accidental, natural, or equivocal deaths. While considering the sociological, psychological, and legal aspects typically found in these cases, the process will take students from the scene to the court, criminal or civil. Enrollment restricted to fully matriculated graduate students in criminal justice and forensic science only.

### CJ 651 Criminal Procedure

An inquiry into the nature and scope of the U.S. Constitution as it relates to criminal procedures. Areas covered include the law of search and seizure, arrests, and right to counsel.

### CJ 652 Sexual Offenders and Predators

An in-depth study of behavioral patterns and dynamics associated with persons who commit sexually motivated crimes and of the processes of victim selection and the identification of sexual offenders.

### CJ 655 Crime Prevention Through Environmental Design

Analysis of theory and applied methods of crime prevention using environmental design methods. Experiential exercises are included.

### CJ 656 Problem-Oriented Policing

In-depth examination of problem-oriented policing, including examination of SARA model, specialized tactics, and methods of community analyses.

### CJ 657 Crime Mapping and Analysis

Survey of Geographical Information Systems (GIS) research and applications in the field of public safety, including analysis of hot spots, density patterns, and forecasts of crime patterns.

### CJ 658 Leadership Issues in Policing

Study of leadership within modern police organizations. Experiential exercises will be included.

### CJ 659 Futures Research: Long-Range Planning and Forecasting in Criminal Justice

An advanced examination of the philosophical underpinnings of the discipline of Futures Research. The distinctions between conventional and long-range planning will be discussed. A multidisciplinary approach will be utilized. The student will learn to make use of several selective forecasting methodologies. The focus will be on the implementation of empirically derived strategies. The context will be justice system organizations. The purpose is to learn to effect meaningful social change.

### CJ 667 Fire and Building Codes, Standards, and Practices

The study of building and fire codes and regulations as they relate to prevention and incidence of structural fires. Contemporary building and fire codes and practices and their enforcement. Model building codes. Fire prevention and control through building design. (See also FS 667.)

### CJ 668 Fire and Casualty Insurance Practices

A study of financial risk and decision making. Insurance rate making and relation to risk and other factors. Insurance adjustment and economic factors that must be considered in fire and accident investigations. (See also FS 668.)

### CJ 669 Dynamics, Evaluation, and Prevention of Structural Fires

A detailed analysis of the evolution of modern structures and the mechanical systems necessary to provide safety and comfort. The effect of the nature of structures and their mechanical systems on fire behavior. Structural basis and mechanical systems for fire protection and fire prevention. (See also FS 669.)

### CJ 670 Selected Topics

A study of selected issues of particular interest to the students and instructor. May be taken more than once.

### CJ 675 Private Security Law

A review and examination of currently applicable federal and state administrative, civil, criminal, and constitutional laws as they relate to the private security industry. The framework of the course will include sources of authority and common law.

### CJ 676 Security Management Seminar

Current problems, concerns, issues, and legislation affecting the private security industry as they relate and are of interest to the students and instructor.

### CJ 677 Private Security in Modern Society

An introduction to current thinking and problems relating to the private security industry. The course will examine such issues as historical growth, role, mission, and future of

the industry. Other topics will include professionalization and ethics in the field.

**CJ 680 Research Issues in Cyberterrorism**
This course will consist of lectures, discussions, and empirical research into issues in cyberterrorism, its causes, its limitations, and its implications. It will focus largely on the thresholds and factors that drive terrorist groups into the information arena, the use of information technology by terrorist groups, and the emergence of new terrorist groups which use the information arena as their primary terrorism mechanism.

**CJ 684 Fire/Accident Scene Reconstruction**
Application of principles of reconstruction of the scene of a fire or accident, including proper procedure for examining physical evidence to determine cause. Emphasis on preparation of reports, testimony for hearings and trials, rendering of advisory opinions to assist in resolution of disputes affecting life and property. (See also FS 684.)

**CJ 690 Research Project I**
Individual guidance on a research endeavor. 1-3 credits

**CJ 691 Research Project II**
Prerequisite: CJ 690. 1-3 credits

**CJ 693 Criminal Justice Internship I**
The student's formal educational development will be complemented by field placement experience in various criminal justice settings or agencies. Field experience will be supervised by designated agency and department personnel.

**CJ 694 Criminal Justice Internship II**
Prerequisite: CJ 693.

**CJ 695 Independent Study**
A directed independent learning experience, the topic and format to be agreed upon by the student and supervising faculty. 1-3 credits

**CJ 697 Thesis I**
Prerequisite: 15 graduate hours. Periodic meetings and discussions of the individual student's progress toward the completion of the thesis.

**CJ 698 Thesis II**
A continuation of Thesis I.

**CJ 699 Thesis III**
A continuation of Thesis II.

## Chemical Engineering

**CM 621 Air Pollution Fundamentals**
Prerequisite: CH 601 or permission of instructor. An introduction to the sources of air pollution, transport of gaseous and particulate pollutants in the atmosphere on local and global scales, transformations of pollutants by atmospheric processes, impact of airborne pollutants on the environment, control of sources of air pollution, and legislative mandates. Introduction to meteorological concepts and computer transport models. Current issues such as ozone depletion and global warming will also be discussed. (See also CE 661.)

**CM 622 Air Pollution Control**
Prerequisite: CM 621 or permission of instructor. Covers conventional and emerging air pollution control technologies. Conventional technologies include cyclone separators, baghouse filters, wet scrubbers, electrostatic precipitators, thermal and catalytic incineration, absorbers, and adsorption systems. Emerging technologies will vary with new developments. Legislative mandates related to control technologies and emission limits will be discussed.

**CM 624 Chemical Process Safety**
Prerequisite: undergraduate degree in engineering, chemistry, or physics, or permission of instructor. Methods of analysis and design for the control of hazards as applied to a chemical process environment. Emphasis on applications and current industrial practices. Topics include characterization of chemical hazards, toxic release modeling, fire and explosion prevention, pressure relief equipment design, hazard identification/risk assessment techniques, and accident investigation.

**CM 670 Selected Topics**
A study of selected issues of particular interest to the students and the instructor. May be taken more than once.

**CM 690 Project**
Prerequisite: 15 graduate hours or permission of the department chair and program coordinator. Independent work under the guidance of an advisor in an area of mutual interest, each study terminating in a technical report of academic merit. May involve research or design activity to solve a significant technical problem which utilizes chemical engineering concepts.

**CM 695 Independent Study I**
A planned program of individual study under the supervision of a member of the faculty.

**CM 696 Independent Study II**
A continuation of Independent Study I.

**CM 698 Thesis I**
Prerequisite: completion of 15 credits of graduate work. Periodic meetings and discussion of the individual student's progress in the preparation of a thesis.

**CM 699 Thesis II**
A continuation of Thesis I.

## Communication

### CO 620 Applied Communication in Organizations

This course is a survey of communication theory as applied to the organizational environment. Special attention will be directed toward management communication styles, conflict, disagreement, change in organizations, formal v. informal power and communication, people in organizations, structure of organizations, motivations, barriers to effective communication, and competencies involved in effectively communicating to the organization's internal and external publics.

### CO 621 Managerial Communication

Prerequisite: MG 637 or MG 640 or P 619 or PA 601. Major emphasis on the role of communication in a democracy and the effects of communication content. Brief treatment of content analysis techniques, person-to-person communication, and barriers to the flow of communication.

### CO 623 Communication in Health Care

Examination of the diversity of communication encounters and contexts in which allied health professionals may be involved; emphasis on development of competencies and skills necessary to communicate effectively with staff, patients, and the community. Influence of interpersonal communication and mass media in staff development, patient care, and the marketing of health care. Students will develop a communication campaign aimed at internal and external audiences.

### CO 631 Public Information Dynamics

How the executive can best present the organization in an accurate and favorable light to the news media. Training techniques for the public relations person who will work with executives giving corporate messages internally and press statements externally.

### CO 632 Contemporary Public Relations Issues

Using the case-study approach, the course concentrates on the problems facing management and public relations executives in businesses and other institutions. The problems change from year to year, in tune with developments in society.

### CO 640 Communication Technologies

An in-depth examination for non-technical students of technologies used with visual, voice data, and character information for communicating at a distance, for storing and subsequently retrieving information, and for processing information to improve communication efficiency.

### CO 641 Competition and Regulation in Telecommunication

A study of proceedings before state public utility commissions and the Federal Communications Commission delineating the boundaries between those activities in the telecommunication field subject to regulation, those open to competition with restrictions, and those cleared to be fully competitive. The course will include discussion and analysis of contemporary legal proceedings affecting this topic.

### CO 642 Management of Telecommunication Organizations

A study and comparison of managerial systems and practices in users, manufacturers, distributors, and common carriers of telecommunication facilities. Identification of criteria necessary for developing and maintaining effective telecommunication organizations. Case problems will relate largely to specific instances from this field.

### CO 643 Telecommunication Policy and Strategy

Examination of management policies and strategies for the complex telecommunication organization operating in a dynamic environment, from the viewpoint of the top-level executives of the organization. Development of analytic frameworks for the management of numerous elements involved in assuring the fulfillment of the goals of the total organization. Integration of the student's general business knowledge with the content of the course. Emphasis is placed on the examination and discussion of cases drawn largely from the telecommunication industry.

### CO 670 Selected Topics

Prerequisite: permission of advisor. An in-depth examination of a topic in the field of communication which reflects the special research of a faculty member or the special interest of a group of students. May be taken more than once.

### CO 693 Internship

A program of field experience, approved by the program advisor, under the tutelage of a professional in the field of communication.

### CO 695 Independent Study I

A planned program of individual study or research in communication under the supervision of a member of the faculty.

### CO 696 Independent Study II

A continuation of Independent Study I.

### CO 698 Thesis I

Prerequisite: 15 graduate hours.

Periodic meetings with the advisor for discussion of the individual student's progress in the preparation of a thesis.

### CO 699 Thesis II

A continuation of Thesis I.

## Computer Science

### CS 601 Technology in the Workplace

Prerequisite: Graduate standing. Comprehensive coverage of the knowledge and skills needed by a manager to make effective IT decisions and manage state-of-the-art systems. Topics include productivity software, networks, malware, digital rights, software engineering standards, outsourcing, and applied cryptography.

### CS 604 Introduction to Programming/C

Prerequisite: College Algebra (M 109 or equivalent). A first course in computer programming using the C language, for those with little or no experience with programming. Problem-solving methods, program planning, development, and testing. Sound programming practices and good style. Simple preprocessor usage, objects, expressions, functions, libraries, basic types, arrays, and pointers. Extensive programming will be required.

### CS 610 Intermediate Programming/C

Prerequisites: College Algebra (M 109 or equivalent) and CS 604 or permission of instructor. An intermediate-level programming course covering all aspects of the ANSI C language, its preprocessor, syntax and semantics, modern usage, design and solution techniques, as well as elements of data structures, algorithms, and analysis of programs. Emphasis is on construction of portable, modular programs.

### CS 616 Assembly Language

Prerequisites: CS 610, CS 640. Introduction to assembly language programming, including study of instruction types and operation, assembly language syntax and features, explicit use of memory, macros, subprograms, interrupts, I/O conversions, linking with higher-level programs.

### CS 617 Java Programming

Prerequisite: CS 620. Object-oriented programming, graphic interfaces, and event handling in Java, using the Abstract Windows Toolkit. Also covers files, exceptions, concurrency and synchronization with threads.

### CS 620 Data Structures

Prerequisite: CS 610. An examination of data structures, their function and uses. Topics include basic data representations, arrays, linked structures, stacks, queues, trees, graphs, hashing. Study of relation between data structures and algorithms, with sorting and searching, elements of complexity analysis. Recursion and other solution techniques. Students will develop and run several programs in a high-level language.

### CS 622 Database Systems

Prerequisite: CS 604 or knowledge of a programming language. A survey of database systems, their purpose, structure, function, and use. Topics include an overview of DB systems, major DB models, design and implementation methods in DB models, introduction to typical DB systems, and internal operation of DB systems.

### CS 622B Advanced Database Systems

Prerequisites: CS 610, CS 622. A second course in database systems, covering advanced topics and new developments in the database field. Topics from: database design methodologies and evaluation, embedded SQL, concurrency control, recovery schemes, security, query processing and optimization, and an introduction to object-oriented databases.

### CS 623 Rapid Software Development/Visual Basic

Prerequisites: CS 620, CS 622. A course for experienced programming students in rapid software development within the environment of Visual Basic. Topics include the VB IDE (Integrated Development Environment), human-computer interaction, GUI interface development, legacy remote-database connectivity using ODBC, as well as Data Access Object (DAO), Remote Data Object (RDO), and ActiveX Data Object (ADO) methods. Students will conceive, design, code, implement, document, and present a substantial programming project as the final product of this course.

### CS 625 Software Project Management

Prerequisite: CS 628. A course for software professionals who are interested in expanding their knowledge of software project management. Topics include project management and roles, project planning including software and estimation, software quality, industry standards, technical staff evaluation, team management, project recovery, and risk management.

### CS 626 Object-Oriented Principles and Practice/C++

Prerequisite: CS 620. An advanced programming course taught in the C++ language. Objects, methods, abstract data types, data hiding, templates, inheritance, polymorphism, exception handling. Students will design and code several modular projects using C++.

### CS 627 Distributed Database Systems

Prerequisites: CS 622, CS 644. A course on the concepts, analysis, and design of distributed database systems. Topics include distributed database architectures, distributed database design, semantic data control, distributed query processing, optimization of distributed queries, query decomposition, localization of distributed data, transaction management, concurrency control, distributed object management, distributed database reliability, parallel database systems.

### CS 628 Object-Oriented Analysis and Design

Prerequisite: CS 617 or CS 626 or permission of instructor. An object-oriented design methodology course. Topics include system analysis, design, and implementation. Primary emphasis on the Unified Modeling Language (UML) methodology and its importance in developing a software project. Students will design a major group project and implement portions using C++ or Java.

### CS 630 Introduction to Computing Theory

Introduction to the theory of computers and computation including study of formal systems and methods; regular expressions, formal languages and grammars, elements of parsing theory, and the Chomsky hierarchy; finite automata and pushdown automata; decidability; Turing machines, Post machines, and other formal computer models; and elements of complexity theory.

### CS 632 Algorithm Design and Analysis

Prerequisite: CS 620. Study of the time and space complexity of algorithms and of efficient algorithm design. Topics include amortized analysis, advanced data structures, greedy algorithms, divide-and-conquer, dynamic programming, randomized algorithms, NP-Completeness.

### CS 633 Topics in Algorithms

Prerequisite: CS 632. Important algorithms usually omitted in earlier courses. Topics to be selected at the instructor's discretion from, but not limited to, measuring performance of algorithms, graph algorithms, string searching, range searching, red-black trees, B-trees, splay trees, random number generators, computational geometry, the fast Fourier transform, number theoretic algorithms, parallel algorithms, randomized algorithms.

### CS 634 Cryptography and Data Security

Prerequisite: CS 610. A survey of cryptographic concepts and algorithms and their application to data security. Techniques studied include private key cryptosystems, public key cryptosystems, and hash functions. Commonly used algorithms will also be studied, including DES, 3DES, IDEA, RSA, Diffie-Hellman, MD5, SHA, and DSS. Other algorithms examined will be those used to provide confidentiality, message authentication, key exchange, and digital signatures in applications such as client-server authentication, email security, and web security.

### CS 636 Structure of Programming Languages

Prerequisites: CS 620, CS 630, and knowledge of at least two high-level computer languages. The structure, syntax, and semantic aspects of computer languages will be studied. Programs will be written in the FORTH language.

### CS 640 Computer Organization

The structure and the function of computers. The nature and the characteristics of modern computer systems and the operation of individual components: CPU, control unit, memory units, and I/O devices. Topics include addressing methods, machine-program sequencing, microprogramming, complex I/O organization, interrupt systems, multiple-module memory systems and caches, peripheral devices, microprocessors, pipeline organization, and memory interleaving.

### CS 640B Parallel Computer Architectures

Prerequisites: CS 610, CS 640. Parallel and other high-performance architectures and their implications for system software, including three structural classes: pipelined computers, array processors, and multiprocessor systems. Topics include the memory, the I/O subsystems, and the interconnection network needed in parallel computers; the design principles and applications of pipelined super-computers; the interconnection structure of array processors; operating system controls; coordination of parallel activity; and performance of parallel systems.

### CS 642 Computer Networks and Data Communication

Prerequisites: CS 610, CS 644. The ISO 7-level model, network topology, communications theory, protocols, virtual circuits and packet switching, local networks (CSMA/CD, token ring), error detection and correction. Additional topics may include security (Data Encryption Standard, public-key cryptosystems), TCP/IP, sockets.

### CS 644 Operating Systems

Prerequisites: CS 610, CS 640. Study of the function, structure, and design of computer operating systems, principally multiprogramming systems. Topics include management of processes and processor resources, of data and memory and of peripheral

devices; concurrent processes; system protection; scheduling; paging and virtual systems.

### CS 644B Distributed Operating Systems

Prerequisite: CS 644. A second course in operating systems, and system architecture covering advanced topics in distributed systems, and the new technology in hardware/software developments. Includes: hardware and software concepts of distributed systems, interprocess communication, distributed objects, message-oriented and stream-oriented communication, synchronization, process scheduling, fault tolerance, consistency, replication, distributed file systems, real-time distributed systems, concurrency and access control.

### CS 645 Network Administration

Prerequisite: CS 644. Fundamentals of administration of a networked computer. Topics include basic duties of a system administrator, overview of TCP/IP networking, file system layouts, user management, network services such as DNS, NIS, DHCP, file sharing, printing, mail, ftp, web, interfacing different operating systems on one network, and general security issues including prevention through firewalls and secure shells. Lab exercises will use both Unix and Windows systems.

### CS 646 Introduction to Computer Security

Prerequisite: CS 644. Knowledge of networks is desirable. A survey of computer and network security issues including types of network attacks, viruses, intrusion detection and tracking, firewalls, trust relationships and authentication, secure connections, cryptography, and recent security policy and legislation.

### CS 646B Topics in Computer Security

Prerequisites: CS 645 and CS 646. An in-depth look at the security-related issues of a selection of services and applications provided by computers in various infrastructures. Such services may include, but are not limited to the following: email, websites, E-commerce support, communication techniques such as IM and VOIP, databases, directory services, authentication using PKI, KDC, and biometrics, e-voting, J2EE, and .Net computing and server hardening.

### CS 647 Systems Programming

Prerequisite: CS 644. Techniques for systems programming using the C language and libraries. Topics include data structures for system implementation, string processing, macro preprocessors, conditional compilation, UNIX system calls including file operations and process control, interprocess communication, client-server routines.

### CS 649 Network Analysis

Prerequisite: EE 610 or CS 642. Building on a foundation knowledge of local area networks (LANs), wide area networks (WANs), and the OSI model, both large and small network designs are explored through lectures, labs, and an individual and a major group project. Topics and labs include Windows server administration, UNIX connectivity, Ethernet and Token Ring networks, implementing WANs using a simulated T1 environment, wireless LAN environments, configuring DSL routers, multi-vendor routers, managed switches, and network packet examination.

### CS 650 Computer Graphics

Prerequisites: CS 620, M 610 or equivalent. The mathematical foundations for computer graphics and introduction to the current state of the art of graphics programming. Includes 2-D and 3-D viewing, geometric transformations, clipping, segmentation, user interaction, curves, surfaces, color, modeling, and object hierarchy.

### CS 652 Script Programming for Network Administration

Concepts and details of writing small programs in Python for the Unix and Window-Server operating systems. Security issues in shell scripts, batch file programming, Python scripts, and C programming. Students will write scripts to control the network and to exploit security holes in the systems.

### CS 655 Internet Applications with Java

Prerequisite: CS 617 or permission of the instructor. A second course in Java surveying many techniques for communicating information over the Internet. Topics include establishing network connections, remote method invocation, database connectivity, servlets, JavaServer Pages, JavaBeans, XML, and internationalization.

### CS 657 Programming Window Systems

Prerequisite: CS 626. A survey of facilities found in all window operating systems including the window manager, the event queue, icons, and fonts. Othet topics include bitmap display, use of resources in a dialog editor, preserving state information in a registry, and providing context-sensitive help. Programming assignments will use a package such as Microsoft Foundation Classes.

### CS 660 Artificial Intelligence

Prerequisite: CS 620. Principal techniques of a functional programming language and the fundamental goals and methods of artificial intelligence (AI), a field which attempts to simulate intelligent behavior by computer. Includes the design and implementation of AI programs.

**CS 663 Mobile Robotics**
Prerequisites: CS 620, CS 644. Principles of construction and navigation of mobile robots. Topics include locomotion mechanisms, sensor types and usage, reactive behavior, tracking, obstacle avoidance, path planning, and communication schemes for remote control. Students will work both individually and in groups to construct and program small mobile robots using Lego Mindstorms kits.

**CS 665 Digital Image Processing**
Prerequisites: CS 620, M 610 or equivalent. Theoretical and mathematical bases of techniques of digital image processing and programming methodologies necessary to implement such techniques. Introduction to current capabilities of digital image acquisition hardware. Implementation of standard procedures for image enhancement, morphology, compression, and storage. Image transforms and information extraction techniques in both the spatial and Fourier frequency domains.

**CS 670 Selected Topics**
Prerequisite: The nature of any prerequisites will depend on the topic. An examination of new developments or current practices in computer science. Topics will vary from trimester to trimester.

**CS 690 Master's Project**
Prerequisites: 15 credit hours, a quality point ratio (QPR) of at least 3.3, and completion of all core courses. Petition to register must be approved by a supervising faculty member, the program coordinator, and the department chair. Completion of a significant project in the student's concentration area under the guidance of an advisor, such study terminating in a technical report of academic merit. For example, the project may be a survey of a technical area in computer science or may involve the solution of an actual or hypothetical technical problem.

**CS 691 Computer Security Certification Preparation**
Under the supervision of a faculty member, the student will prepare for taking an industry standard certification exam. This will include writing an independent research paper on a current security topic and passing an exam similar in nature to the certification exam.

**CS 692 Internship I**
Prerequisites: CS 620, 18 graduate credit hours, QPR of 3.0 or better, and permission of graduate coordinator and advisor. An on-the-job learning experience with a selected organization, taken for academic credit under the supervision of a faculty internship advisor. This is a Free Elective course only and may not be counted as a Restricted Elective. 1 credit

**CS 693 Internship II**
A continuation of Internship I. 1 credit

**CS 694 Internship III**
A continuation of Internship II. 1 credit

**CS 695 Independent Study I**
Prerequisite: Petition to register must be approved by a supervising faculty member, the program coordinator, and the department chair. Independent study under the guidance of an advisor in an area designated by the program coordinator in consultation with the student.

**CS 696 Independent Study II**
A continuation of Independent Study I.

**CS 698 Thesis I**
Prerequisites: 15 credit hours and completion of all core courses. Petition to register must be approved by a supervising faculty member, the program coordinator, and the department chair. Periodic meetings and discussion of the individual student's progress in the preparation of a thesis.

**CS 699 Thesis II**
A continuation of Thesis I.

## English

**E 600 English Language Workshop**
Enrollment in this course is limited to and required of students who are not native speakers of English and who lack adequate background in English instruction. Students whose TOEFL scores are less than 560 (220 on the computer-based test) and/or students who enter the Graduate School following completion of an intensive English language program are required to take and pass this training course in the first term of enrollment at the Graduate School. The course emphasizes development of conversation, pronunciation, and composition skills and includes orientation to the Peterson Library and instruction in writing a research paper. No credit

**E 634 Applied Linguistics**
This course is designed for teachers of writing at all levels. It helps students develop insights into sentence structure and development which, in turn, will be benefical for transmitting systematic editing techniques at various school levels. The course will focus on sentence structure and touch upon phonetics and language history. (See also ED 634.)

**E 659 Writing and Speaking for Professionals**
A practical, tool-oriented approach for professionals who need to perfect writing and speaking skills for career advancement or presentations in graduate courses. Students genetate

work-related writing/speaking assignments and negotiate learning contracts based on editing, writing, and speaking methods related to individual needs and objectives. (See also HU 659.)

## Economics

### EC 601 Macroeconomics and Microeconomics

A basic theoretical foundation for students who lack adequate background in economics. An introduction to and review of basic economic principles.

### EC 603 Microeconomic Analysis

Prerequisites: EC 601, QA 604. Survey of the behavior and decision choices of individual economic agents (e.g., consumers, firms, and resource owners) under alternative market conditions, time horizons, and uncertainty.

### EC 604 Macroeconomic Analysis

Prerequisites: EC 601, QA 604. Study of the performance and fluctuations of the economy, focusing on economic policies that affect performance. Topics include consumption and investment, the determinants of changes in wages and prices, monetary and fiscal policies, money, interest rates, the federal budget, the national debt, and interdependence and policy between countries.

### EC 625 Industrial Relations

Survey of problems, strategies, and policies of management interactions with formal and informal labor organizations. Labor legislation, collective bargaining, productivity analysis, and arbitration are stressed, with emphasis on negotiating strategies and techniques.

### EC 627 Economics of Labor Relations

Survey of labor economics using the tools of economic and institutional analysis. Emphasis on human resources and demographics pertaining to labor markets.

### EC 629 Business and Society

Prerequisite: EC 601. Topics include forces shaping business institutions through emerging social, legal, ethical, and political issues such as pollution control, workplace issues, equal employment opportunity, product safety, and relations with external stakeholders. Also addressed, using lectures and cases, will be laws and regulations that govern and restrict business activities.

### EC 633 Managerial Economics

Prerequisites: EC 601, FI 601. Application of the major tools of economic analysis to problems encountered by management, presented using lectures and case studies. Topics include measurement of market demand, cost analysis, expenditure and production decisions, price determination in competitive markets which include the entrepreneurial enterprise, as well as the allocation of capital and investment.

### EC 641 International Economics

Prerequisite: EC 601. Examination of international trade, foreign exchange, and capital markets. Topics include national policy in an open economy, international policy coordination, and globalization.

### EC 644 Managing in Global Markets

Prerequisites: EC 601, FI 601, MG 637, and MK 609. This course provides the student with an understanding of the effects of globalization on the economic environment and corporate operations. It examines the multinational's operations and the many adaptations management must undertake to successfully interact with the various global business environments. Topics will be examined from both domestic and international perspectives and will include the operational and strategic adjustments necessary for the multinational to navigate among the diverse and rapidly evolving cultural, political, economic, financial, operational, and ethical environments of global markets.

### EC 665 Urban and Regional Economic Development

Prerequisite: EC 601. Techniques, methods of analysis, and models utilized in the development process. Emphasis on job creation, manufacturing assistance, free enterprise zones, and regional planning.

### EC 670 Selected Topics

A study of selected issues of particular interest to students and instructor. May be taken more than once.

### EC 679 Industrial Relations Seminar

Prerequisites: EC 625, EC 687, MG 637, and P 619, or permission of instructor. A seminar in industrial relations and the labor-management relations function of the modern work organization. The use of an integrated behavioral, economic, and legal approach permits an applied multidisciplinary synthesis of the employee relations function required in either nonunionized or unionized work organizations.

### EC 687 Collective Bargaining

Recommended: EC 625. Emphasis on contract negotiation, whether in a formal or informal bargaining scenario. Contract development covers wages, benefits, job security, management's rights, equal opportunity, and grievance procedures. Additional time devoted to third-party settlements

and the arbitration process.

**EC 690 Research Project**
Prerequisite: permission of the instructor. A major independent research study/project carried out under faculty supervision.

**EC 693 Internship**
Prerequisites: 15 graduate hours and permission of program coordinator. A supervised work experience in a selected organization, arranged for course credit and directed by a faculty advisor.

**EC 695 Independent Study I**
A planned program of individual study under the supervision of a member of the faculty.

**EC 696 Independent Study II**
A continuation of Independent Study I.

**EC 698 Thesis I**
Prerequisite: 15 graduate hours. Periodic meetings and discussions of the individual student's progress in the preparation of a thesis.

**EC 699 Thesis II**
A continuation of Thesis I.

## Education

Some course numbers in this field are followed by the suffixes "E" for elementary, "M" for middle grades/middle school, and "S" for secondary.

**ED 600 Student Teaching**
This practicum satisfies the requirement of the State of Connecticut for teacher candidates to demonstrate attainment of the appropriate CT Teaching Competencies in a culminating clinical activity of supervised student teaching. 6 credits

**ED 601 Introduction to Education**
This course introduces students to the field of education. Students will learn about the CT Teaching Competencies and classroom management techniques and will be given a broad overview of school-related issues. 1 credit, to be taken in advance of first trimester of study.

**ED 603 Human Growth and Development**
A study of the major aspects of human development from conception through adolescence, presenting the important theories and research methods of the field and tracing the physical, cognitive psychological, and social development of each chronological division.

**ED 604 Educational Psychology**
Content emphasizes the application of psychological principles and research results to the teaching-learning process. Includes learning principles, development, planning instruction, evaluating student performance, classroom management, and motivation.

**ED 605 Students with Special Needs**
Provides prospective educators with an understanding of methods used to identify, diagnose, and teach exceptional students in regular and special classrooms. Describes the developmental and learning characteristics of exceptional students, reviews educational and supportive services, and examines laws impacting on the education of students with special needs.

**ED 606 History of American Education**
Survey of the relationship between education and American culture through a focused study of the history of public schooling in the United States. Study of events, developments, and moods that have shaped American education from colonial times, through the first century of American independence, the Progressive reform era, and the Depression era, to the current day. 2 credits

**ED 608 Child Development**
A study of the physical, cognitive, and social development of children, with special emphasis on major theories and research methods.

**ED 609 Adolescent Development**
A study of the physical, cognitive, and social development of adolescents, with special emphasis on major theories and research methods.

**ED 611 Learning and Intelligence**
Examination of the dynamics of the major explanations of learning and intelligence; learning as the core of behavior.

**ED 612 Curriculum Design**
Application of theoretical knowledge of curriculum to real course planning. Investigation and analysis of current educational programs in terms of curricular theory as well as training for teachers in basic curriculum development techniques. Permission of the Education Department Chair required.

**ED 614 Philosophy of Education**
A critical analysis of education in contemporary society as reflected in the thinking of modern and early philosophers. (See also PL 614.)

**ED 615A/B/C/D/E Strategies in Mathematics Content**
Provides current and future teachers with specialized training in teaching specific content areas of mathematics. 1 credit for each content area.

**ED 615A Geometry I**

**ED 615B Geometry II**

**ED 615C Graphing Calculators**

**ED 615D Discrete Methods**

**ED 615E Remedial Mathematics**

**ED 616A/B/C/D/E Strategies in Science Content**
Provides current and future teachers with specialized training in teaching specific content areas of science. 1 credit for each content area.

**ED 616A Chemistry**

**ED 616B Physics**

**ED 616C Earth Science**

**ED 616D Biology**

**ED 616E Integrating Mathematics and Science**

**ED 617A/B/C/D/E Strategies in Social Science Content**
Provides current and future teachers with specialized training in teaching specific content areas of the social sciences. 1 credit for each content area.

**ED 617A Constitutional Law**

**ED 617B Political Science**

**ED 617C Governance**

**ED 617D Local History and Historical Methods**

**ED 617E Geography**

**ED 618A/B/C/D/E Strategies in Business Content**
Provides current and future teachers with specialized training in teaching specific content areas of business. 1 credit for each area.

**ED 618A Computer Technology**

**ED 618B Software Applications**

**ED 618C International Business**

**ED 618D Economics**

**ED 618E Marketing and Advertising**

**ED 619A/B/C/D/E Strategies in English Language**
Provides current and future teachers with specialized training in teaching specific content areas of the English language. 1 credit for each content area.

**ED 619A Humanities**

**ED 619B Research Writing**

**ED 619C Journalism**

**ED 619D Poetry**

**ED 619E Drama**

**ED 620 Seminar in Multicultural Issues**
A series of lectures, dialogues, and discussions to promote understanding of the diverse ethnic, cultural, and economic groups composing American society as they interact in the schools. 1-

**ED 621E Teaching Strategies in Mathematics**
Introduction to current concepts and trends in the field of mathematics instruction with particular focus on new materials, methods, and teaching strategies that will assist prospective teachers as they plan, present, and evaluate mathematics education. 2 credits

**ED 621M/S Teaching Strategies in Mathematics**
Introduction to current concepts and trends in the field of mathematics instruction with particular focus on new materials, methods, and teaching strategies that will assist prospective teachers as they plan, present, and evaluate mathematics education.

**ED 622E Teaching Strategies in Science**
Introduction to current concepts and instructional techniques in the field of science teaching; focuses on providing teachers with the skills, knowledge, and methodologies for teaching science.

**ED 622M/S Teaching Strategies in Science**
Introduction to current concepts and instructional techniques in the field of science teaching; focuses on providing teachers with the skills, knowledge, and methodologies for teaching science.

**ED 623E Teaching Strategies in Social Studies**
Introduction to current concepts and trends in the field of social studies instruction with particular focus on new materials, methods, and teaching strategies that will assist prospective teachers as they plan, present, and evaluate social studies education. 2 credits

**ED 623M/S Teaching Strategies in Social Studies**
Introduction to current concepts and trends in the field of social studies instruction with particular focus on new materials, methods, and teaching strategies that will assist prospective teachers as they plan, present, and evaluate social studies education.

**ED 624 Teaching Strategies in Business**
Focus is on the strategies for teaching business concepts and practices to pre-university students.

**ED 625E Teaching Strategies in Children's Literature and Language Arts/Elementary**
Introduction to materials and methodologies used to develop the reading, writing, listening, and speaking skills of students, with special emphasis on the wealth of literature available for elementary school students.

**ED 625M Teaching Strategies in Literature and Language Arts/Middle School**
Introduction to materials and methodologies used to develop the

reading, writing, listening, and speaking skills of students, with special emphasis on the wealth of literature available for middle school students.

### ED 625S Teaching Strategies in Language Arts/Secondary School

Introduction to the materials and methodologies used to develop the reading, writing, listening, and speaking skills of secondary school students.

### ED 626E Strategies for Teaching Reading and Language Arts in Elementary School

Introduction to current concepts and trends in reading instruction in the elementary school, including practical reading and writing assessment techniques. Special emphasis on the literacy-based development of beginning and skilled readers and the diversity of student abilities, cultural backgrounds, and language.

### ED 626M Reading in the Content Areas

Introduction to current concepts and trends in content area reading in the middle school. Students will appreciate a wide range of print and nonprint texts that can be used to build an understanding of the cultures of the United States and the rest of the world. Fiction, nonfiction, classic, and contemporary works will be studied.

### ED 626S Reading in the Content Areas

Introduction to current concepts and trends in content area reading in the secondary school. Students will appreciate a wide range of print and nonprint texts that can be used to build an understanding of the cultures of the United States and the rest of the world. Fiction, nonfiction, classic, and contemporary works will be studied. 2 credits

### ED 627 Reading and Writing Across the Curriculum

Designed for teachers in the middle school and high school content areas. Focuses on training teachers to implement a variety of instructional methods related to developing writing skills across disciplines.

### ED 628 Reading Diagnosis and Remediation

Examines both traditional and innovative means of assessing reading strengths and needs as well as corrective instruction. Fundamental principles of diagnosis and instruction in reading are presented, providing a philosophical basis for working with all reading students, whether in regular classrooms, special education settings, remedial reading classes, or reading clinics.

### ED 630E Children's Literature

Provides knowledge of children's and young adults' publications; introduces students to the wealth of literature available for young readers and its potential for enhancing classroom instruction. Selection of interesting and well-written materials based on knowledge of human development to motivate, expand, and diversify instruction. 2 credits

### ED 630S Reading and Adolescent Literature

Provides knowledge of children's and young adults' publications; introduces students to the wealth of literature available for young readers and its potential for enhancing classroom instruction. Selection of interesting and well-written materials based on knowledge of human development to motivate, expand, and diversify instruction.

### ED 632 Content Updates

Focuses on the knowledge bases required for teaching in the specific content areas and major disciplines. 1-; may be taken more than once, limited to six credits in any one content area.

### ED 633 Visual and Performing Arts in the Elementary Classroom

Introduction to current ideas and instructional techniques for the visual and performing arts as they pertain to an elementary school classroom; focuses on providing teachers with skills, knowledge, and methodologies for teaching art, music, and theater. Students will be asked to attend a series of lectures or performances at local theaters, concert halls, or museums. 1-

### ED 634 Applied Linguistics

This course is designed for teachers of writing at all levels. It helps students develop insights into sentence structure and development which, in turn, will be benefical for transmitting systematic editing techniques at various school levels. The course will focus on sentence structure and touch upon phonetics and language history. (See also E 634.)

### ED 635 History of Science

This course introduces students to the history of science from the Scientific Revolution to the present. It will deal with the development of new ideas and the contexts in which they are constructed. It will assist students to understand how people developed ideas to interpret nature and why they changed those ideas.

### ED 636 Early Literacy

This course examines the literacy skills and process that reflect current research and best practices in the field of early literacy instruction. The course summarizes the research on how children learn to read and reviews the literacy skills and competencies children need to acquire to become successful readers and writers.

Teacher candidates will learn effective classroom instructional strategies and assessment practices, including the components of a comprehensive and balanced literacy program in the primary grades.

**ED 637 Strategies for Teaching Art**
Prerequisite: Permission of the Education Department. Introduction to current concepts and trends in the field of art education with particular focus on new materials, methods and teaching strategies that will assist prospective teacher candidates as they plan, present and evaluate art education.

**ED 638 Strategies for Teaching Music**
Prerequisite: Permission of the Education Department. Introduction to current concepts and trends in the field of music education with particular focus on new materials, methods and teaching strategies that will assist prospective teacher candidates as they plan, present and evaluate music education.

**ED 642E/M/S Current Instructional Trends**
Course designed to update classroom teachers' knowledge of instructional methodologies in particular content areas. Topics vary depending on the content area and major disciplines. 2 credits; may be taken more than once; limited to six credits in any one content area.

**ED 650 Law for Teachers**
Online Version

**ED 654E/M/S Organization and Structure in the Schools**
Study of the structural arrangements and organizational practices in the classroom and in the school unit at the different levels of education: elementary, middle school, and secondary.

**ED 661 Job Readiness and the Labor Market for Secondary School Students**
Online Version

**ED 670/671 Selected Topics**
Study of selected and timely issues of particular interest to the student.

**ED 680 Contemporary Issues**
Seminar course on current issues related to American education and the differing viewpoints expressed. While the exact content is expected to vary from year to year, in accordance with the varied interests of educators and the general public, the basic theme is the exposition of the fundamental and present concerns in education.

**ED 681 Principles of Classroom Management**
No prerequisite course is required. This course introduces students to the basic principles of effective classroom and behavior management. The course will examine historical and contemporary theories, classroom models, and case study analyses. The importance of contextual variables such as instructional goals, socioeconomic levels, cultural imperatives, and students' cognitive skills will also be examined.

**ED 682 Measurement, Assessment, and Evaluation**
Trains teachers and other educators to construct reliable and valid measurements for a variety of pedagogical situations, to identify major standardized testing instruments, to use test results efficiently and effectively, and to design a variety of assessment strategies appropriate to students, staff, and functions.

**ED 683 Computer Applications for Teachers**
Online Version

**ED 685 Research in the Schools**
An in-depth analysis of research on teaching practices, including the study of quantitative and qualitative research techniques. Students are required to conduct mini research projects and to design a research proposal for a final project.

**ED 687 Field Project I**
An individualized project related to the classroom, to the curriculum, or to school methodology. 1-

**ED 688 Field Project II**
An individualized project related to the classroom, to the curriculum, or to school methodology. 1-

**ED 689 Research Design**
This course introduces students to the techniques of educational research. Students will learn how to design a research project, how to read and critique professional journal articles, and how to design a research project appropriate for elementary, middle, or secondary students. 2 credits

**ED 690 Research Project**
Prerequisite: ED 689. Independent study under the supervision of an advisor for completion of a significant school-based project designed in ED 689 which satisfies the requirement of a final project for obtaining the graduate degree. 1-

**ED 691 Capstone Project**
This course is required for those students who do not serve as interns. Students will research and prepare a teaching portfolio. Non-interns must show evidence of having served 100 hours of participation in a child-centered activity. Students will not receive credit for both ED 691 and ED 694. 2-

**ED 692 Field Experience I**
Practicum intended to provide gradu-

ate students with field experiences in area schools under university supervision. All students are expected to attend seminars. Students participating as interns will register for ED 692 I, and Capstone students (non-interns) will register for ED 692C. 1 credit

**ED 693 Field Experience II**
Continuation of ED 692. All students are expected to attend seminars. Interns will register for ED 693 I, and Capstone students (non-interns) will register for ED 693C. 1 credit

**ED 694 Field Experience III**
Continuation of ED 693. All students are expected to attend seminars and to complete a teaching portfolio. Interns will register for ED 694 I, and Capstone students (non-interns) will register for ED 694C. 2 credits

**ED 695 Independent Study I**
A planned program of individual study under the supervision of a member of the faculty. 1-

**ED 696 Independent Study II**
A continuation of Independent Study I. 1-

**ED 698 Thesis I**
Prerequisite: 15 graduate hours. Periodic meetings and discussions of the individual student's progress in the preparation of a thesis.

**ED 699 Thesis II**
A continuation of Thesis I.

## Electrical and Computer Engineering

**EE 603 Discrete and Continuous Systems I**
Prerequisite: computer programming competence. Continuous and discrete linear systems, system function. Z transforms, Fourier transforms, periodic functions, discrete Fourier series, fast Fourier transforms, Hilbert transforms. Digital processing of analog signals, sampling theorems.

**EE 604 Discrete and Continuous Systems II**
Pretequisites: EE 603 and M 611, or consent of instructor. Review of linear vector spaces, bases, Hilbert spaces. Introduction to the similarity transformation, diagonalization of the A matrix, properties of similarity transformations, Jordan forms, quadratic forms, matrix norms, functions of A matrix, Caley-Hamilton theorem, pseudoinverse. Mathematical modeling of physical systems, state space representation of dynamical systems, computer-oriented mathematical models. State space and linear systems, meaning of state, methods of obtaining state equations. Stability of physical systems and linear systems, linearization and stability in the small, equivalent linearization and the describing function, stability in the large and the second method of Liapunov, exact frequency domain stability criteria — Popov's method and its extension.

**EE 605 Computer Controlled Systems**
Prerequisites: EE 604 and EE 650. Disturbance models, design, analog design, state space design methods, pole placement design based on input-output models, optimal design methods (state space approach), optimal design methods (input-output approach), identification, adaptive control, implementation of digital controllers, reduction of the effects of disturbances, stochastic models of disturbances, continuous time stochastic differential equation.

**EE 606 Robot Control**
Prerequisite: EE 605. Orientation coordinate transformations, configuration coordinate transformations, Denavit-Hartenberg coordinate transformations, D-H matrix composition, inverse configuration kinematics, motion kinematics, force and torque relationships, force and moment translation, trajectories, coordinated motion, inverse dynamics, position control, feedback systems,

**EE 607 Adaptive Control**
Prerequisites: EE 605, EE 650, or consent of instructor. An introduction to adaptive control methods and their application. The identification and control of linear deterministic time-invariant dynamical systems with parametric uncertainty are emphasized. Topics such as real time parameter estimation, model reference adaptive systems, robust adaptive control, and implementation issues are covered.

**EE 610 Networking I**
Reference models TCP/IP and OSI, transmission media, Data Link Layer issues, the Medium Access Control Sublayer, Networking devices and topologies, LANS, WANS, lab experiments.

**EE 611 Networking II**
Prerequisite: EE 610. Network layer design, routing algorithms, congestion control algorithms, transport layer issues, application layer, network security, lab experiments.

**EE 620 Fuzzy Logic and Control**
Prerequisites: basic linear algebra, probability, systems theory. Introduction to fuzzy logic and fuzzy control systems. Basic fuzzy logic concepts will be covered, followed by a selection of fuzzy applications from the literature. Topics include fuzzy sets, fuzzy numbers, fuzzy relations, fuzzy logic and appropriate reasoning, fuzzy rule-based systems, fuzzy control, fuzzy classification, fuzzy pattern recognition. Homework will consist of computer exercises and simulations; a final project is required.

**EE 630 Electronic Instrumentation I**
Prerequisite: permission of instructor. Design of modern electronic instrumentation. Circuit and system examples, evaluation and design techniques. Emphasis on practical applications including design theory and the circuit techniques used in linear integrated devices. Variety of electronic instrumentation including computer interfaces, signal conditioners, waveform generators and shapers, filters, V/F, A/D, D/A converters, and other special-purpose circuits.

**EE 631 Electronic Instrumentation II**
Prerequisite: EE 630.

**EE 634 Digital Signal Processing I**
Prerequisite: EE 603. A study of the theories of digital signal processing and their applications. Topics include discrete time signals, the Z-transform, the discrete Fourier transform, the FFT, homomorphic signal processing, and applications of digital signal processing.

**EE 635 Digital Signal Processing II**
Prerequisites: EE 634 and knowledge of programming in MATLAB or other high-level language. Wiener filter theory, linear prediction, adaptive linear filters using gradient estimation, Least Mean Squares (LMS) algorithm, least squares formulation and the Recursive Least Squares (RLS) algorithm, fast implementations, recursive adaptive filters, lattice structures, eigenstructure methods for spectral estimation elements of adaptive nonlinear filtering, and applications.

**EE 637 Power Systems Engineering I**
Prerequisite: permission of instructor. Concepts and methods of analysis and design of modern power systems. Includes the network representation of power systems, matrix methods, symmetrical components, and the use of the computer in the solution of problems such as short circuit fault calculations, load flow study, economic load dispatching and stability. Other topics may include protection, relaying, or transmission system design.

**EE 638 Power Systems Engineering II**
Prerequisite: EE 637.

**EE 639 Electric Power Distribution**
Prerequisite: EE 637 or equivalent. Structure of electric power distribution, distribution transformers, subtransmission lines, substations, bus schemes, primary and secondary systems, radial and loop feeder designs, voltage drop and regulation, capacitors, power factor correction and voltage regulation, protection, buses, automatic reclosures, and coordination.

**EE 645 Introduction to Communication Systems**
The analysis and design of communication systems. Includes analog and digital signals, sampling, quantization, signal representation. Analog and digital modulation, pulse code modulation, delta modulation, time and frequency multiplexing. Noise in communication systems.

**EE 646 Digital Communications I**
Prerequisite: EE 645. Formatting and baseband transmission, bandpass modulation and demodulation, communication link analysis, channel coding synchronization.

**EE 647 Digital Communications II**
Prerequisite: EE 646. Multiplexing and multiple access, spread spectrum techniques, source coding and encoding, encryption and decryption.

**EE 648 Microwave Engineering**
Prerequisites: Undergraduate Electromagnetics, programming experience, preferable in MATLAB, Graduate Standing or permission of instructor. This course is designed to familiarize the students with microwave components and their operating principles. This course covers transmission line, including microstrip and coplanar waveguides, impedance matching, S parameters, Smith chart, couplers/dividers, waveguides, EM simulators, and antennas. Some homework assignments may require use of computer-aided design software.

**EE 649 Wireless Communications**
Prerequisites: Undergraduate Electromagnetics, programming experience, preferable in MATLAB, Graduate Standing or permission of instructor. This course is designed to introduce the fundamental concepts and applications of wireless communications. Topics: Path loss and fading, mobile radio channel, channel capacity, digital modulation scheme, coding, and multiple access.

**EE 650 Random Signal Analysis**
A study of the theory of random signals and processes. Includes correlations, spectra, stationarity, ergodicity, and systems with random inputs. Hilbert's transforms, shot noise, thermal noise, Markoff processes, mean square estimation, spectral estimation, and entropy.

**EE 652 Design of Digital Filters**
Techniques in the analysis and design of digital filters. Digital filter terminology and frequency responses. FIR filter design. IIR digital filter design including Butterworth and Chebyshev low-pass, high-pass, bandpass, and bandstop filters. The DFT and IDFT; FFT algorithms.

**EE 653 Digital Image Processing**
Prerequisites: Working knowledge of signal analysis and linear algebra. Programming experience, (languages such as MATLAB, C.net, java, C++), Graduate Standing or permission of instructor. Fundamental concepts and applications of image processing and analysis. Topics include image formation, imaging geometrics, image transform theory and restoration, encoding and compression.

**EE 656 Hardware Description Language**
General structure of VHSIC (Very High Speed Integrated Circuit) Hardware Description Language (VHDL) code; entities and architecture in VHDL; signals, variables, data types; concurrent signal assignment statements; processes; if, case, and loop statements; components; package; functions and procedures; slices; attributes; generate statements; blocks; projects on design of combinational and sequential circuits using VHDL.

**EE 657 VLSI Design**
Complex logic gates, flip-flop, cascade voltage switch logic, differential split level logic, Schmitt trigger, dynamic logic gates, clocked CMOS logic, Domino logic, SRAM and DRAM, VCO, Voltage generator, lab activities.

**EE 658 Embedded Applications**
Design of advanced embedded microcontroller applications. Interface and control of several devices and buses. Classwork will focus on laboratory exercises and projects.

**EE 670 Selected Topics**
Prerequisite: permission of instructor. A study of selected topics of particular interest to students and instructor. Course may be taken more than once.

**EE 680 Fiber Optic Communications**
The fundamentals of fiber optics technology and optical systems, light emission and detection, single- and multi-mode fibers, LED and semiconductor lasers, optical detectors, signal degradation, power launching and coupling, connectors, and splicers, geometric optics, ray tracing, system requirements for point to point link analysis. Includes selected laboratory experiments.

**EE 681 Lightwave Technology**
Prerequisite: EE 680. Advanced topics in lightwave technology. Optical fiber waveguides, transmission characteristics of optical fibers, ray theory, and electromagnetic mode theories are considered. Forms of communication systems and distribution networks. Optical sources, detectors, and receivers are discussed in conjunction with modulation formats and system design.

**EE 682 Computer Architecture**
Review of design of large systems, arithmetic and logical operations, design of ALU, design of control unit, microprogramming, RISC architecture, memory organization, design of cache memory, system organization, design of a processor using bit-slice ALU.

**EE 685 Optimization of Engineering Systems**
Prerequisite: EE 604. The calculus of variations, functionals, linearity of functionals, closeness of functions, the increment of a functional, maxima and minima of functionals, the fundamental theorem of the calculus of variations, the variational problem, Euler-Lagrange equations, boundary conditions, the transversality conditions, piece-wise-smooth extremals, the first and second carrier conditions, Lagrange multiples, the Hamiltonian canonical equations, the control problem, the problems of Lagrange and Mayer, Strong's variation, Legendre conditions, Weierstrass excess function, Pontryagin's minimal principle.

**EE 690 Research Project**
Prerequisites: 15 graduate hours and written permission of program coordinator. Independent study under the guidance of a faculty advisor, such study terminating in a technical report of academic merit. Research may constitute a survey of a technical area in electrical engineering or involve the solution of an actual or hypothetical technical problem.

**EE 695 Independent Study I**
Prerequisite: permission of instructor. A planned program of individual study or research under supervision of a faculty member.

**EE 696 Independent Study II**
A continuation of Independent Study I.

**EE 697 Thesis I**
Prerequisites: completion of 15 credits of graduate work; student must have submitted a thesis proposal and performed a literature search in the preceding trimester. Periodic meetings and discussions of the individual student's progress in the preparation of a thesis.

**EE 698 Thesis II**
A continuation of Thesis I.

**EE 699 Thesis III**
A continuation of Thesis II.

## Engineering Management

**EM 604 Concepts of Engineering and Quality Management**
Introduction to contemporary engineering management concepts as they appear in organizations. Review of the

challenges faced by such organizations, and the various methodologies in use to meet these challenges. Review of the complex and dominant role that quality plays in creating excellent customer-supplier relationships. Discussion of quality goals and management strategies to achieve them.

### EM 607 Decision Making Under Uncertainty

Concepts of probability and applications of probability theory for dealing with uncertain situations in engineering and technology management. Topics include random variables, probability functions, expectations, discrete and continuous distributions, probability computation, summary measure, data presentation schemes and their applications in process control, forecasting, lead time estimation, queues and customer demand functions. Excel and other software will be used.

### EM 609 Applied Statistics for Quality and Engineering Management

Prerequisite: EM 607 or equivalent. Comprehensive survey of the many roles of statistics in TQM, quality assurance, simulation, experimentation, risk assessment, and performance evaluation. Topics include confidence intervals, statistical process control, analysis of variance, regression, and nonparametric methods and their applications in engineering management. Excel and other software will be used. Deming, Juran, Taguchi, and ASQ contributions are presented as engineering management resources.

### EM 613 Organizational Change and Development

This course is targeted towards managers and other change agents within organizations. Organizational change fosters the development of competency in skills necessary during all phases of the planned change process – from diagnosis, to interventions, through evaluation. Organizational change issues are critically examined, and case studies, exercises, and assessments are utilized to better understand change from organizational, group, and individual levels. 2 credits

### EM 615 Applied Marketing for Engineers and Operations Managers

Prerequisite: Graduate standing. An intensive study of modern marketing fundamentals in a diverse, global economy; a study of the decision-making problems encountered by marketing managers, using lectures and case studies. 2 credits

### EM 627 Value Engineering and Design

Prerequisite: EM 609 or equivalent. A framework for optimal design based on internal and external issues related to value-added criteria is provided. Topics to be covered include: function analysis and costing, the technology roadmap, and techniques involving customer-oriented product concepts in the areas of performance, maintenance/service, user friendliness, and quality. Case studies and real world situations are presented.

### EM 628 Six Sigma Quality Planning

Prerequisite: EM 609 or equivalent. Six Sigma is a very powerful management tool and its application promises increased market share, cost reductions and dramatic improvements in bottom-line profitability for companies of any size. This course uses a "hands-on" approach to Six Sigma by introducing students to methodologies, tools, analysis methods and process improvement techniques. Upon completion of the course, students should be able to deploy Six Sigma techniques within a company and lead small-scale improvement projects.

### EM 630 Project Management

Prerequisite: EM 609 or equivalent. Review of CPM-PERT methodologies and use in managing complex engineering-related projects. Analysis of bias in estimating and in forecast preparation. Strategies for achieving on-time task completion and minimizing critical chains. 2 credits

### EM 639 Achieving Optimal Operations

Prerequisites: EM 604 and EM 609 or equivalent. Concepts of lean production, Japanese production systems, push vs. pull production systems, benchmarking and evaluation schemes, schedule management, overcoming bottlenecks, and performance and productivity improvement techniques applicable to service and manufacturing systems. Workforce issues (affairs) including union acceptance, productivity, and workforce education, training and compensation.

### EM 641 E-Solutions & Supply Chain Management

Prerequisites: EM 639 or equivalent. The process of planning, implementing, and controlling flow and storage of goods, services, and related information from point to consumption with the customer requirements in mind is presented. Topics include fundamentals of logistics and e-logistics, logistics information systems and e-commerce, inventory concepts and management, material flow and transportation management, warehousing and material handling, the rapid increase in the type and use of electronic media in the daily functions of supply chain management, and global logistics.

### EM 673 Special Topics in Engineering Management

Prerequisite: Permission of the program coordinator. Current topics relevant to engineering management but

focusing on specific themes including but not limited to technology leadership and entrepreneurship, conflict management and negotiation techniques, safety organization and management, corporate law (contracts and patents), and environmental laws and regulations.

### EM 681 Simulation Techniques and Applications

Prerequisites: EM 609 and EM 639 or equivalent. Review of the role of computer simulation in analyzing complex systems and operations. Emphasis on problem formulation, model building, input and output data analysis, experimentation and evaluation of alternative designs/processes in complex systems/operations. Case studies of successful implementations are reviewed together with guidelines for using state-of-the-art simulation software (ARENA currently in use) to solve system problems.

### EM 690 Research Project

Prerequisites: 15 graduate hours or permission of the program coordinator. Independent study and research focused on a problem of interest in either a work environment or in a community or non-profit organization. Guided by a faculty advisor, a project report is written that describes the problem, outlines the scope of work, and presents recommendations and solutions in a professional manner. An oral presentation is made to program colleagues, a capstone experience ending the program of study.

## Environmental Science

### EN 600 Environmental Geoscience

Study of the systems of hydrosphere and lithosphere important in the understanding of the causes of and solutions to environmental problems, including natural hazards as well as energy, mineral, and water resources. Course covers material from geology and engineering geology, geophysics, geomorphology, and hydrology.

### EN 601 Principles of Ecology with Laboratory

Presentation of current topics in the various fields of ecology including community, population, ecosystem, and landscape ecology. Particular emphasis on those areas related to applied ecology. Field trips and laboratory sessions will focus on a quantitative evaluation of various ecological systems in terrestrial and aquatic habitats and on methods used in ecological assessment. Laboratory fee; 4 credits

### EN 602 Environmental Effects of Pollutants

Prerequisites: EN 600, EN 601, and undergraduate organic chemistry or graduate introduction to environmental chemistry. A survey of the demonstrated and suspected effects of air, water, and other pollutants on natural systems and on human welfare. Methods of studying and assessing effects are also presented.

### EN 603 Wetlands Ecology with Laboratory

Prerequisites: EN 600, EN 601. This course covers the ecology of saltwater and freshwater wetland systems. Linkages between the biotic, hydrologic, and chemical components of various wetland types will be emphasized. Wetland delineation, functional assessment of wetlands, and wetland creation and restoration will be among the topics discussed. Field trips and laboratory sessions will focus on a quantitative evaluation of the hydrology, soils, and biotic communities of various wetland types. Laboratory fee; 4 credits

### EN 604 Ecology of Inland Waters

Prerequisites: EN 600, EN 601. Advanced study of ecological processes of inland waters, both lotic and lentic. Some weekend field trips, or acceptable alternative, required.

### EN 605 Marine and Estuarine Ecology

Prerequisites: EN 600, EN 601. Advanced study of ecological processes of estuaries and marine habitats. Some weekend field trips, or acceptable alternative, required.

### EN 606 Environmental Data Analysis

Prerequisites: 15 graduate hours and a previous course in statistics, or permission of instructor. The application of analytic techniques to environmental data in the areas of applied ecology, environmental geology, and chemistry. These include applied univariate and multivariate statistics as well as geostatistical methods. Introduction to microcomputer software available for environmental analyses.

### EN 607 Environmental Reports and Impact Assessment

Prerequisites: 21 graduate hours including EN 600, EN 601, and CE 606. A study of the EIS/EIA process including the regulatory framework, how to prepare environmental reports and impact assessments, formats required for EIS and other common reports, data collection and presentation, planning and carrying out assessments, and text preparation. Some fieldwork may be required.

### EN 608 Landscape Ecology

Prerequisites: EN 600, EN 601. In-depth study of the characteristics and dynamics of terrestrial and aquatic ecosystems on a regional scale.

### EN 609 Data Analysis in the Environmental and Biological Sciences

Prerequisites: 9 graduate hours and a previous course in statistics, or permission of instructor. The application of data analysis techniques in the environmental (applied ecology, environmental geology and chemistry) and biological (molecular biology, toxicology) sciences. These include applied univariate and multivariate statistics as well as geostatistical and non-detect methods. Extensive use of different types of computer software for data analyses.

### EN 610 Environmental Health

Prerequisite: EN 601 or undergraduate biology major. Principles of public health with general emphasis given to environmental factors such as air and water pollutants, legal standards, and preventive measures and their relationships to public health.

### EN 612 Epidemiology

An introduction to the principles and methods of epidemiology. Concepts of disease, analysis of morbidity and mortality as well as observational and experimental techniques are considered. Illustrative examples concentrate on environmental issues.

### EN 613 Radioactivity and Radiation in the Environment

Prerequisites: EN 600 and CH 601, or permission of instructor. Basic principles of nuclear structure and radioactivity; the interaction of radiation with matter and biological effects of radiation; natural and man-made sources of radiation in the environment. The second half of the course will focus on long-term environmental effects of radiation accidents (e.g., Chernobyl and others) and the problems of nuclear waste disposal, plutonium inventories from nuclear weapons, natural radon in buildings, and similar concerns. (See also PH 613.)

### EN 615 Toxicology

Prerequisite: introductory chemistry. Introduction to environmental and industrial toxicology; toxicologic evaluation; the modes of entry, absorption, and distribution of toxicants; the metabolism and excretion of toxic substances; interactions between substances in toxicology; toxicologic data extrapolation; particulates; solvents and metals; agricultural chemicals—insecticides and pesticides; toxicology of plastics; gases; food additives; plant and animal toxins; carcinogens, mutagens, and teratogens.

### EN 616 Human Health and Environmental Risk Assessment

Prerequisites: EN 601, CE 606, and EN 615. Introduction to application of human health and environmental risk assessment by environmental agencies. Principles of environmental risk assessment, legislative mandates for risk assessment, guidance documents, case studies, analysis and assessment procedures. Emerging developments in the field reviewed through class projects.

### EN 617 Subsurface Assessment

Prerequisites: EN 600, CH 601, and CE 606. Introduction to conducting subsurface contamination assessments. Includes related environmental regulations and liabilities, site hydrogeology, chemical characterization of contaminants, field methodologies, risk assessments, and site contamination remediation. Some fieldwork required.

### EN 618 Hazardous Materials Management

Prerequisites: CE 606 and undergraduate organic chemistry or graduate introduction to environmental chemistry (CH 600). The multidisciplinary facets of managing hazardous materials and wastes. Integrates specialized knowledge from the fields of environmental biology, chemistry, engineering, hydrogeology, and public health in the techniques used to maintain compliance with environmental standards. Includes regulatory framework, practical exercises, and concepts of sound practices of hazardous waste management.

### EN 620 Advanced Environmental Geology

Prerequisite: EN 600 or undergraduate course in geology or permission of instructor. Qualitative and quantitative examination of the application of geology to environmental problems including natural hazards and their remediation, site selection for various types of land uses, geology of waste disposal sites, and natural resource evaluation. A class project for a local government or environmental agency will demonstrate practical application of these principles and will be used to examine the process of project planning and management, generation and use of geologic data, report preparation and presentation. Laboratories and some weekend fieldwork required. 4 credits

### EN 621 Hydrology

Prerequisite: undergraduate course in physics, geology, hydraulics, or limnology or permission of instructor. Lectures cover basic hydrologic theory including nature and chemical behavior of water, precipitation and evapotranspiration, interception, surface water, groundwater supply and treatment, and water law. Other topics may include irrigation, flood control, karst hydrology, and water chemistry. Required laboratories cover field measurement, sampling and problem-solving techniques. Some weekend fieldwork required. 4 credits

### EN 622 Groundwater Geology

Prerequisite: EN 600 or EN 621 or CE 620 or permission of instructor. Physical and chemical behavior of

water occurring in rock and soil (groundwater). Covers the geologic environments in which groundwater exists, groundwater movement and chemistry, karst hydrology, use of groundwater as a water supply, groundwater field investigations and testing, contaminant transport in groundwater, and the nature and use of groundwater flow and contaminant models. Laboratories will include practical experience in field techniques (drilling, geophysical, well, logging, etc.), modeling, and data analysis. 4 credits

### EN 625 Geomorphology

Prerequisite: EN 600 or a previous college-level course in physical geology or geography or permission of instructor. Study of landforms and the processes that produce them including the operation of erosional and depositional processes in a variety of geologic settings (fluvial, coastal, glacial, periglacial, karst, and arid). Also covers the relationship of landforms and processes to the solution of environmental problems. Lectures cover processes; required laboratories focus on landform recognition and geomorphic process interpretation using maps and aerial photographs. Two required field trips (one 2-day and one 3-day) with shared transportation and costs. 4 credits

### EN 626 Glacial Geology

Prerequisite: EN 600 or EN 625 or a previous college-level course in physical geology or geography or permission of instructor. Glacial processes, landforms, materials, and history. Relationships between various glacial landforms (identifiable on topographic maps) and the materials that comprise them. Two required field trips in New England (one 1-day and one 2 1/2-day) with shared transportation and costs.

### EN 627 Soil Science

Prerequisite: EN 600 or a previous college-level course in physical geology or geography or permission of instructor. Properties, occurrence, and management of soil as a natural resource. Covers the chemistry, physics, morphology, and mineralogy of soils and their genesis and classification. Soil properties will be related to their role in environmental problem solving and decision making.

### EN 632 Field Geology of the Northeast

Prerequisite: EN 600 or a previous college-level course in geology or permission of instructor. Intensive training in geological field observation and interpretation in a variety of geologic settings. Weekly class meetings cover field techniques and localities. Five required field trips (three 1-day, one 3-day, one 4-day) will focus on site geology, geomorphology, and environmental problems as well as field observation and interpretation. Transportation and costs will be shared. 4 credits

### EN 633 Selected Topics in Field Geology

Prerequisite(s): EN 600 or undergraduate course in geology; other prerequisites depend on specific course topic. Selected field studies and trips of special interest. Credit varies depending on length of trip or investigation. May be taken more than once. 1-4 credits

### EN 640 Introduction to Geographical Information Systems

Survey of GIS technology, research, and applications in natural resource management, environmental assessment, urban planning, business, marketing and real estate, law enforcement, public administration, and emergency preparedness. Includes critical evaluation, case studies, and computer demonstrations.

### EN 641 Geographical Information System Techniques and Applications I

Prerequisites: working knowledge of PC-based computing and consent of instructor/program coordinator. First of a two-course sequence on GIS technology and applications. Laboratory exercises using both raster- and vector-based GIS systems. Hardware and software components of GIS; data acquisition, input, and manipulation; cartographic output; report generation.

### EN 642 Geographical Information System Techniques and Applications II

Prerequisite: EN 641 or consent of instructor. Second of a two-course sequence on GIS technology and applications. Laboratory exercises using both raster- and vector-based GIS systems. Advanced GIS techniques, spatial analysis and modeling for a variety of applications (e.g., environmental science, business, planning), development of GIS systems.

### EN 643 Advanced Applications of GIS

Prerequisite: EN 642 or consent of the instructor. Study of advanced GIS techniques for spatial analysis and management in a variety of application areas (e.g. environmental science, municipal and utilities management). Includes GIS development, GIS modeling, advanced spatial analysis (e.g. geostatistics) and VBA/ArcObjects GIS programming. Students collaborate on a real world project to design and implement a complete GIS application, and conduct individual GIS projects of interest to them, applying techniques learned in class.

### EN 650 Environmental Microbiology

Prerequisites: undergraduate biology major, or a course in biology and a course in organic chemistry.

Interaction of microorganisms (principally bacteria and fungi) and their environments, stressing transformations they may accomplish depending on physical and chemical circumstances. Practical application of microbes in sewage and other soil/wastewater clean-up, biodeterioration, pest control, and production of useful products. Laboratory microcosm projects required. 4 credits

**EN 651 Bioremediation Science**
Prerequisite: EN 650 or permission of instructor. Study of the use of microorganisms to decontaminate/remediate soil, groundwater, and air emissions containing various organic compounds. Includes survey of applicable microbial activities and growth parameters, classes of organic compounds that can be degraded/modified, and application of latest bioremediation technologies for cleanup. Laboratory involves review of site/hydrogeological plans for efficacy of bioremediation, visitation of available bioremediation sites (biopiles, bioventing, biosparging, etc.), and group projects involving site(s) currently undergoing bioremediation. 4 credits

**EN 670 Selected Topics**
A study of selected issues of particular interest to the students and instructor. May be taken more than once.

**EN 690 Research Project**
Prerequisite: permission of the instructor. Independent study under the supervision of an advisor.

**EN 695 Independent Study I**
A planned program of individual study under the supervision of a member of the faculty.

**EN 696 Independent Study II**
A continuation of Independent Study I.

**EN 698 Thesis I**
Prerequisite: 15 graduate hours. Periodic meetings and discussions of the individual student's progress in the preparation of a thesis.

**EN 699 Thesis II**
A continuation of Thesis I.

## Engineering Science

**ES 605 Introduction to Digital Electronics**
Prerequisites: College physics, including electricity and magnetism. An introductory course in digital electronics intended for K-14 teachers based on "Project Lead the Way" curriculum. Both theoretical and practical skills in the pedagogical and content domains needed to teach classes in this field are addressed. Laboratory assignments will include computer simulation of circuits and the wiring of prototype circuits. The lectures will touch on printed circuit board design and implementation of digital circuits. Development of attitudes, procedures, and skills related to safety will be addressed. This course may not be taken by engineering students for graduate credit. Lecture: , Lab: 1 credit

**ES 610 Engineering Graphics with Solid Modeling**
Prerequisites: Modern Algebra with Trigonometry. An introduction to computer-aided design with solid modeling intended for K-14 teachers based on the "Project Lead the Way" curriculum. Both theoretical and practical skills in the pedagogical and content domains needed to teach classes in this field are addressed. Emphasis is on advanced 2-D construction, 3-D solid modeling, and design drawing generation. A PC-based CAD package is used for all coursework. Development of attitudes, procedures, and skills related to safety is addressed. This course may not be taken by engineering students for graduate credit. Lecture: , Lab: 1 credit

## Executive MBA

**EXID 903 The Communication Process**
A survey of communication theory as applied to the organizational environment. Special attention will be directed toward management communication styles, conflict, disagreement, change in organizations, formal versus informal power and communication, people in organizations, structure of organizations, motivation, barriers to effective communication, and communication competencies in organizations. 2 credits

**EXID 909 Business and Government Relations**
An analysis of the impact of the major regulatory agencies of the federal government upon business. Specific attention given to the legal and economic impacts of the agencies; their independence of action vis-a-vis Congress, the judiciary, and each other.

**EXID 912 Financial Accounting**
An understanding of information in financial reports and how managers use this information in decision making. Includes financial accounting standards, methods of financial statement analysis, and current developments in financial reporting.

**EXID 915 Quantitative Decision Making**
Probability and financial analysis techniques within the framework of the randomness encountered in the real world. Includes practical applications of expected values, value of information, Markov systems, game theory, and decision theory.

**EXID 918 Managerial Economics**
Application of economic analysis to business forecasting, planning, and policy formulation. Includes cost-benefit analysis, cost estimation, and break-even analysis.

**EXID 921 Executive Management and Leadership**
The role of managers in globally competitive organizations. Topics include the nature of management and leadership, managing ethically in a global economy, basic management skill sets, and motivational theories.

**EXID 924 Financial Management I**
Analysis of financial decision models for investment, financing, and dividend decisions of the profit-oriented firm. Includes capital budgeting, capital structures, and the cost of capital and dividend policy.

**EXID 927 Financial Management II**
Analysis of financial decision models for the management of working capital. The management of current assets and the related financing mixture.

**EXID 930 Marketing Practice**
The new marketing concept and its application in the modern corporation. Organizational aspects and environmental determinants of marketing decisions are examined, culminating in a discussion of buyer behavior characteristics. Practical considerations in using the elements of the marketing mix: product, price, channel, and promotion policy.

**EXID 933 Managing the Global Marketplace**
An examination of the theory and practice of a national or international company trading in world markets. Focus on strategic planning for this environment from economic, political, social, regulatory, and competitive points of view.

**EXID 939 Operations Management**
An examination of the best practices used by operations management to achieve competitive advantage. Topics include organization, productivity measurement, competitiveness, product and process design, quality management, procurement, JIT, empowerment, and change management.

**EXID 942 Managerial Accounting**
An understanding of the uses of accounting data by managers in directing the affairs of organizations. Includes cost systems, profit planning, standard and relevant costs, and world-class manufacturing concepts.

**EXID 948 Business Law**
This course provides a framework for considering the respective roles of institutional and individual legal responsibility as it relates to major federal statutes commonly invoked in corporate prosecutions. Major emphasis will be placed on employment law, including labor and white-collar prosecutions.

**EXID 951 Marketing Management**
Strategic considerations and options in managing a firm's marketing function. Scope and methods of marketing research as well as issues involved in new product management. The importance, opportunities, and constraints of international marketing. The unique aspects of service marketing.

**EXID 954 Organizational Development**
Effective management of the aggregate human resource in the modern organization. Analysis of human resource planning, recruitment, and selection; training and development; compensation and benefits; other human resource functions. Understanding how to utilize these functions in managing change for organizational effectiveness.

**EXID 957 Corporate Policy and Strategy**
Examination of the major management issues facing the chief executive with emphasis on resource allocation questions. Includes the strategy development process, supporting organization structure, and reward system. Serves as an integrating mechanism for several preceding courses.

**EXID 960 Information Management**
Analysis of technologies, costs, and challenges of integrating computers into the modern business environment.

**EXID 997 The Washington Campus—How Washington Works/International Seminar**
The seminars at the Washington Campus emphasize governmental process and the range of considerations and constraints which bear upon the decisions of policymakers. Corporate executives and future business leaders examine the working of the legislative, regulatory, judicial, and executive functions of government in order to understand more clearly how they, as managers, can build the critical public policy dimension into daily operations and corporate strategy. The faculty of the Washington Campus is drawn from government, business, the press, and academia. It includes members of Congress and their staffs, senior administration officials, lobbyists, journalists, noted scholars, and corporate executives.

As companies expand their markets abroad, they need employees who are globally aware, flexible to changes, and able to understand various social

and business cultures. Therefore, it is important that students be exposed to a variety of perspectives on the real-life issues of doing business in different countries.

### EXID 998 Marketplace–Business Simulation

Prerequisites: EXID 912, EXID 924, EXID 930, EXID 942. In this business simulation students will virtually run a new venture firm for two years in compressed time (8 to 12 rounds of decision making). The real challenge in the game, and in real-life ventures, is that managers must continually make a large number of concurrent strategic and tactical decisions, with no rest from the advertising decision or the market development decision while solving the pricing decision. There is heavy emphasis on the interconnectedness of business functions.

### EXID 999 Special Research Topics

A seminar which culminates in student research being presented and critiqued, and in which state-of-the-art topics may be examined by nonfaculty guest lecturers.

## Executive Engineering Management

### EXIE 901 Engineering Management Concepts

Introduction to contemporary engineering management concepts as they appear in manufacturing and related service organizations. Review of the challenges faced by such organizations and of the various methodologies in use to meet these challenges. Managing the lean enterprise to deliver high-quality product in timely fashion within demanding customer-supplier relationships.

### EXIE 902 Managing Uncertainty

Probability models, stochastic processes, and descriptive statistical approaches applicable to managing engineering and technology projects. Topics include random variables, probability functions, expectations, discrete and continuous distribution, probability computation, summary measures, data presentation schemes and their applications in process control, forecasting, lead time estimation, queues, and customer demand functions. Excel and other software will be used.

### EXIE 903 Statistics for Quality and Engineering Management

Comprehensive survey of the many roles of statistics in TQM, quality assurance, simulation, experimentation, risk assessment, and performance evaluation. Deming, Juran, Taguchi, and ASQ contributions are presented as engineering management resources.

### EXIE 914 Achieving Optimal Operations

Concepts of lean production, Japanese production systems, push vs. pull production systems, benchmarking and evaluation schemes, schedule management, overcoming bottlenecks, and performance and productivity improvement techniques applicable to service and manufacturing systems. Workforce issues including union acceptance, productivity, and workforce education, training, and compensation.

### EXIE 926 Constraint Assessment

Achieving effectiveness, productivity, and profitability through management of constraints. Automation issues, offshore production, union reactions, and access to capital. Strategic planning for optimality.

### EXIE 930 Project Management

Review of CPM-PERT methodologies and use in managing complex engineering-related projects. Analysis of bias in estimating and in forecast preparation. Strategies for achieving on-time task completion and minimizing critical chains.

### EXIE 940 Supply Chain Management

The course presents the process of planning, implementing, and controlling flow and storage of goods, services, and related information from point to point of consumption with customer requirements in mind. Topics include fundamentals of logistics, logistics information systems, inventory concepts and management, material flow and transportation management, warehousing and material handling, and global logistics.

### EXIE 948 Queuing Theory and Applications

Survey of queuing problems met in both manufacturing and service organizations, and a description of queuing theory applicable to such problems. Roles of analysis and simulation are discussed in the context of managing queues and solving queuing problems.

### EXIE 950 Simulation of Processing Systems

Review of the role of simulation in analyzing complex manufacturing and nonmanufacturing systems, and an introduction to typical simulation software. Case studies of successful implementations are presented together with guidelines for using simulation to solve system problems.

### EXIE 956 Managing Quality Assurance

Review of the complex and dominant role that quality plays in creating excellent customer-supplier relationships. Discussion of quality goals and management strategies to achieve them.

### EXIE 957 Organizational Change and Development

This course addresses the nature of organizational development, intervention by third-party consultation, change in organizational structure and role relationships, evaluation of change efforts, participation, conformity, and deviation. The course focuses on real organizations, not hypothetical constructs; on actual human performance challenges, not theoretical issues; and on typical operational problems, not experimental design concerns. Emphasis is on practical application.

### EXIE 960 E-Solutions in Engineering Management

The course presents current and emerging Internet technology as it relates to engineering management; in particular, e-supply, e-logistics, e-commerce, and the rapid increase in the types and uses of electronic media in the daily functions of engineering managers. Topics will also include basics of the Internet and multimedia technologies, products and vendors, and critical management and policy issues such as access, risk assessment, reliability, security, and privacy.

### EXIE 970 Current Topics in Engineering Management

Current topics relevant to engineering management but focusing on specific themes such as environmental laws on regulation, security and protection technologies, new engineering approaches to product and process management, and new process and quality improvement practices.

### EXIE 999 Research Topic

Independent study and research focused on a problem of interest, either in a work environment or in a community/nonprofit organization. Guided by a faculty advisor, a project report is written that describes the problem, outlines the scope of the work, and presents recommendations and solutions in a professional manner. An oral presentation is made to colleagues in this capstone experience ending the program of study.

## Finance

### FI 601 Financial Management

Prerequisites: A 620, EC 601, and QA 604. An examination of the valuation, investment, and financing of the firm and its business activities. Includes valuation of investment under uncertainty and its implications for investment strategy; the cost of capital and capital structure and its implications for financing strategy; leasing; dividend policy; fundamental risk management concepts and implications; and (if time is available) mergers, acquisitions, divestiture, the market for corporate control, and the hedging of corporate risk exposure.

### FI 602 Finance Strategy and Valuation

Prerequisites: A 620, EC 601 or EC 604, FI 601, and QA 604. Examination of valuation, investment, and financing of the firm and their implications for strategic decision making. Topics include objective of the firm and agency theory; strategies for the investment decision; short-term financial management strategies; theories of choice and decision making; state preference theory and its implications for planning and strategy; risk measurement and decision making; derivatives and their applications to corporate risk management and planning; efficient capital markets and value creation; capital structure; valuation models and dividend policy; merger and acquisition strategies; the leasing decision and business planning; international financial management strategies.

### FI 605 Data Evaluation and Modeling

Prerequisite: FI 601. Introduction to the quantitative models used in finance. Application of statistical and deterministic models to financial decision making. Use of electronic spreadsheets and statistical software.

### FI 610 Capital Market Theory

Prerequisite: FI 601. A review of modern portfolio theory. Includes theory of choice under certainty and uncertainty; portfolio analysis; capital asset pricing model; arbitrage pricing model; global investing and portfolio formation; and portfolio performance measurement, evaluation, and selection.

### FI 611 Equity Market Valuation and Analysis

Prerequisite: FI 601. Integrated review of investment opportunities in the securities markets. Includes capital market efficiency and arbitrage; valuation models and individual security analysis and valuation; aggregate market analysis; capital market theory; global investing and portfolio performance; alternative investments—analysis and valuation; and introduction to regulation and professional standards of ethics.

### FI 612 Applied Portfolio Management

Prerequisite: FI 601. Course describes and demonstrates the dynamic decision-making process of portfolio management. The portfolio construction process, including the formulation of objectives, constraints, and preferences; the ongoing monitoring process; and conducting a performance evaluation. Special attention to recent developments in dynamic portfolio applications.

### FI 613 Derivative Market Analysis and Trading Techniques

Prerequisite: FI 601. An examination

of financial futures and options markets; futures and options pricing and hedging; trading techniques.

**FI 620 Capital Markets and the Valuation of Fixed Income Securities**
Prerequisite: FI 601. The function and structural trends of financial markets. Analysis of the flow of funds; foundation of interest rates; term structure of interest rates; determinants of interest rates; global financial markets.

**FI 625 Advanced Capital Market Issues**
Prerequisites: FI 605, FI 620. An examination of current practices and new developments in the capital markets. Various topics will be selected that highlight recent developments. The primary areas of selection will be financial and capital market innovations, monetary policy, domestic and international money markets, and techniques for analyzing financial markets. Students will be required to complete a major, independent research project.

**FI 630 Corporate Financial Analysis and Applications**
Prerequisite: FI 601. The examination of short-term financial management, mergers and acquisitions, corporate restructuring, financial distress, corporate risk management, leasing, and hybrid corporate securities.

**FI 631 Management of Financial Services**
Prerequisite: FI 601. An examination of operational techniques and strategies relevant to financial management in the financial services industry.

**FI 632 International Financial Management**
Prerequisite: FI 601. Focus on international capital markets, determinants of foreign exchange rates, and hedging techniques. Major emphasis on managing and measuring accounting, economic, and operations exposure; managing political risk; international capital budgeting and short-term financial management; international financing of investment.

**FI 635 Advanced Corporate Financial Management Issues**
Prerequisites: FI 602, FI 605. An examination of developments and techniques in financial management, highlighting recent developments. The primary areas of selection will be value creation, human capital, globalization, risk management, and strategic management. Students will be required to complete a major research project.

**FI 670 Selected Topics**
A study of selected issues of particular interest to students and instructor. May be taken more than once.

**FI 690 Research Project**
Prerequisite: 15 graduate hours or permission of the instructor. Independent study under the supervision of an advisor.

**FI 693 Internship**
Prerequisites: six credits of advanced finance coursework and approval of program coordinator/advisor. A program of field experience in a corporate or financial services organization.

**FI 695 Independent Study I**
A planned program of individual study under the supervision of a member of the faculty.

**FI 696 Independent Study II**
A continuation of Independent Study I.

**FI 698 Thesis I**
Prerequisite: 15 graduate hours. Periodic meetings and discussions of the individual student's progress in the preparation of a thesis.

**FI 699 Thesis II**
A continuation of Thesis I.

## Forensic Science

**FOR 614 Survey of Forensic Science**
An introductory survey of forensic sciences and criminalistics, crime scene procedures and documentation, and methods of laboratory analysis for all forensic science students.

**FOR 616 Advanced Crime Scene Investigation**
An in-depth study of crime scene procedures including recognition, protection, documentation, and collection of physical evidence; scene documentation, scene search procedures; and reconstructions from evidence and scene patterns.

**FOR 620 Advanced Criminalistics I**
Corequisite: FOR 621. The comparison and individualization of physical evidence are presented in lectures and carried out in the laboratory. The theories and practice of microscopic, biological, immunological, and chemical analysis are applied to the examination of blood, semen, and other body fluids.

**FOR 621 Advanced Criminalistics I Laboratory**
Concurrent registration in FOR 620 Advanced Criminalistics I is required. Laboratory fee required. 1 credit

**FOR 625 Chemistry of Fires and Explosions**
An examination of the basic organic chemistry and combustion and explosive properties of flammable materials. The chemical principles underlying fires and explosions. Chemical properties of various synthetic materials and the products of their combustion. Fire retardant materials and chemicals used in fire extinguishment. (See also CH 625.)

**FOR 632 Advanced Investigation I**
An in-depth study of modern principles and techniques of criminal and civil investigations. Management of investigations, use of witnesses, interviewing, polygraph, backgrounds, establishment of MO, missing persons, surveillance, and investigation of questioned deaths and death scenes.

**FOR 633 Advanced Investigation II**
An in-depth study of the principles and techniques of criminal and civil investigations. Investigation of fraud, embezzlement, white-collar crime, property crimes, sexual assaults and other crimes against persons; extortion; kidnapping; drug trades; and traffic accidents.

**FOR 640 Advanced Criminalistics II**
Introduction of advanced microscopic, chemical, and instrumental methods with extensive hands-on experience provided by a laboratory section. Principles and methods of analysis of microscopic and macroscopic evidence such as glass, soil, papers, inks, dyes, paints, varnishes, explosives, fibers, drugs, and other potential physical traces will be discussed.

**FOR 641 Advanced Criminalistics II Laboratory**
Laboratory fee required. 1 credit

**FOR 645 Drug Chemistry and Identification**
Introduction to licit and illicit drugs as evidence, followed by an overview of chemical, microscopical, and instrumental techniques used for their identification; discussion of sampling, separation, and quantitation of evidence specimens; presentation of drug chemistry expert testimony in courts of law.

**FOR 653 Physical Analysis in Forensic Science**
The classic firearms examination, classification, and comparison of bullets and cartridges, toolmarks comparison and striation analysis, serial number restoration, document examination, voiceprint identification, fingerprints, and polygraphy examination.

**FOR 654 Physical Analysis in Forensic Science Laboratory**
Laboratory fee required. 1 credit

**FOR 660 Forensic Microscopy**
The theory and techniques of optical microscopy required to use the microscope for evidence detection, analysis, and evaluation. Microscopical methods of analysis and polarized light microscopy will be covered in lecture and laboratory. Laboratory fee required. 4 credits

**FOR 661 Medicolegal Investigation and Identification**
An introduction to procedures and techniques for medicolegal investigation of questioned death and identification of deceased persons, including autopsy techniques, odontological procedures, and anthropological approaches.

**FOR 662 Forensic Toxicology**
An in-depth analysis of forensic toxicological procedures and methods; determinations of metallic, volatile, and soluble poisons; analysis for narcotic drugs and other drugs of abuse and dosage form drugs that are commonly abused or found contributing to cause of death. Laboratory fee required. 4 credits

**FOR 663 Advanced Forensic Serology I**
A comprehensive study of the theory and practice of isoenzyme, serum protein, and immunoglobulin genetic markers in human blood and body fluids. Electrophoretic and isoelectric focusing techniques. Interpretation of genetic marker results in blood individualization. Laboratory fee required. 4 credits.

**FOR 664 Advanced Forensic Serology II**
A comprehensive study of the theory and practice of biochemical and immunologic procedures for blood and body fluid identification; typing of Rh, MNSs, and other red cell antigens in blood and blood stains; antiserum selection and evaluation; ELISA techniques; DNA polymorphism analysis. Laboratory fee required. 4 credits

**FOR 670 Selected Topics**

**FOR 673 Biomedical Methods in Forensic Science**
Prerequisite: FOR 616. Corequisite: FOR 674. Methods of modern biochemistry, genetics, and molecular biology as applied to the examination and individualization of biological evidence in forensic science. Includes discussion of prior methods up to the most current used today in forensic biology.

**FOR 674 Biomedical Methods in Forensic Science Laboratory**
Concurrent registration in FOR 673 Biomedical Methods in Forensic Science is required. Laboratory fee required. 1 credit

**FOR 686 Forensic Science Research Project I**
Individual guidance on a research endeavor. 1-

**FOR 687 Forensic Science Research Project II**
Prerequisite: FOR 686. 1-

**FOR 688 Forensic Science Internship I**
Formal educational development is complemented by field placement

experience in a forensic science laboratory or identification unit. Field experience is supervised by designated agency and department personnel. Students must complete a project in connection with the internship placement and experience; an appropriate work product must be provided to the instructor.

**FOR 689 Forensic Science Internship II**
Prerequisite: FOR 688.

**FOR 695 Independent Study**

**FOR 697 Thesis I**

**FOR 698 Thesis II**
A continuation of Thesis I.

**FOR 699 Thesis III**
A continuation of Thesis II.

## Fire Science

**FS 625 Chemistry of Fires and Explosions**
An examination of the basic organic chemistry and combustion and explosive properties of flammable materials. The chemical principles underlying fires and explosions. Chemical properties of various synthetic materials and the products of their combustion. Fire retardant materials and chemicals used in fire extinguishment. (See also CH 625.)

**FS 631 Organization and Management of Public Fire Protection**
A presentation of modern management principles and techniques of the organization and delivery of the array of services that communities have come to expect from the fire service. The traditional and evolving roles of fire service protection, prevention, risk analysis, and community service are also considered.

**FS 632 Strategic Planning for the Fire Service**
The application of systematic long-range or "master" planning in determining the types and levels of community fire service. As part of this course each student will develop a strategic plan for a public safety organization using one of the commonly accepted approaches to strategic planning in the public domain.

**FS 633 Issues in Public Safety Professional Responsibility**
This course addresses the unique ethical problems and environments in which public safety services are delivered. Specific issues covered include public safety discretion, codes of conduct and discipline, and the ethical exercise of the "public trust." Investigation of the ways in which organizations can anticipate and plan for ethical problems.

**FS 634 Issues in Public Safety Management**
Provides public safety professionals with a broad view of current topics in the field. Utilizing lectures, discussions, and case studies, the course will consider the results of applying modern public management practices and principles in a public safety context.

**FS 649 Fire Scene Investigation and Arson Analysis**
The techniques of crime scene documentation and investigation as they relate to fire and explosion scenes. Evidence recognition and collection. Laboratory analysis of fire scene, arson accelerant, and explosion scene residues. Scientific proof of arson. Laboratory fee required. 4 credits (See also CJ 649.)

**FS 650 Arson for Profit**
This course provides an overview of the financial techniques needed to investigate arson-for-profit fires, with an emphasis on sources of information, identification, and analysis of financial documents.

**FS 661 Systems Approach to Fire Safety**
The systems approach to fire safety as used by fire protection engineers, fire science technicians, and fire administrators in analyzing and designing fire safety in buildings. Considers the various routes that can be followed to achieve low-budget, logical, cost-effective ways of accomplishing predetermined fire safety goals.

**FS 663 Fire Protection Systems Application**
A study of the application of various fire protection systems and programs to fire/life safety problems. An in-depth review of certain fire protection codes and standards and the proper interpretation of each will be included. Use of codes and standards to determine specific protection requirements will be emphasized.

**FS 664 Terrorism**
A detailed discussion and review of the consequences of terrorism and the offensive measures taken by emergency response organizations to prevent, deter, and respond to terrorism incidents.

**FS 665 Legal Aspects of Fire and Arson Investigation**
The legal principles underlying and governing the conduct of criminal investigations, with particular emphasis on arson. The criminal law relating to arson, establishment of the crime, investigation, and prosecution procedures in arson cases.

**FS 666 Industrial Fire Protection**
Prepares fire professionals to make decisions on various fire protection schemes in industry and other commercial property situations. Since fire protection responsibilities are often delegated to the occupational safety or security manager, the course provides background in fire protection for these individuals.

**FS 667 Fire and Building Codes, Standards, and Practices**
The study of building and fire codes and regulations as they relate to prevention and incidence of structural fires. Contemporary building and fire codes and practices and their enforcement. Model building codes. Fire prevention and control through building design. (See also CJ 667.)

**FS 668 Fire and Casualty Insurance Practices**
A study of financial risk and decision making. Insurance rate making and relation to risk and other factors. Insurance adjustment and economic factors that must be considered in fire and accident investigations. (See also CJ 668.)

**FS 669 Dynamics, Evaluation, and Prevention of Structural Fires**
A detailed analysis of the factors and physical processes that govern the growth and spread of fire and its products within a structure. Includes a review and an evaluation of national, state, and local fire loss data leading to the development of fire prevention strategies. (See also CJ 669.)

**FS 670 Selected Topics**
An examination and evaluation of the current and future problems faced by today's fire, public safety, insurance, and security professionals.

**FS 681 Seminar/Research Project in Public Safety Management I**
Prerequisite: 18 undergraduate/graduate hours in a public safety discipline or permission of the program coordinator. Problems in public safety management and current techniques being used to deal with them. Requires a supervised research project directly related to the topic and weekly meetings with faculty throughout the term. Format of course may vary; a three-day specially scheduled seminar may be included.

**FS 682 Seminar/Research Project in Public Safety Management II**
A second course in the field of public safety management. See FS 681 for course description.

**FS 683 Seminar/Research Project on Comparative Public Safety Systems**
Prerequisite: 18 undergraduate/graduate hours in a public safety discipline or permission of the program coordinator. Examination, assessment, and comparison of various approaches used in protecting the public's health and safety. Current management approaches to public safety problems. Requires a supervised research project directly related to the topic and weekly meetings with faculty throughout the term. Format for course may vary; a three-day specially scheduled seminar may be included.

**FS 684 Fire/Accident Scene Reconstruction**
Application of principles of reconstruction of the scene of a fire or accident, including proper procedure for examining physical evidence to determine cause. Emphasis on preparation of reports, testimony for hearings and trials, rendering of advisory opinions to assist in resolution of disputes affecting life and property. (See also CJ 684.)

**FS 690 Research Project**
Prerequisite: 30 graduate credit hours. A major research project under the supervision of the director of the fire science program.

**FS 693 Internship**
The student's formal educational development is complemented by field experience in various fire science settings or agencies. Under faculty supervision, the student engages in field experience and produces a comprehensive project report analyzing the internship experience.

**FS 695 Independent Study**
A directed, independent learning experience with the topic and format to be agreed upon by the student and supervising faculty.

**FS 698 Thesis I**
Prerequisite: 15 graduate hours. Periodic meetings and discussions of the individual student's progress in the preparation of a thesis.

**FS 699 Thesis II**
A continuation of Thesis I.

## History

**HS 607 World History in the Twentieth Century**
A survey of major global events and trends since 1900. Advanced industrial societies emphasized, but major regions of the Third World also studied. Includes the World Wars, patterns of economic cooperation and competition, decolonization, and East-West conflicts.

**HS 610 Survey of United States History**
Broad-based review of American history from colonial period to the present. This course is designed specifically for preservice teachers to meet Connecticut state certification requirements.

**HS 650 Latin American History**
Analyzes the history of colonial Latin America from Ancient America and pre-contact fifteenth-century Europe through to the nineteenth century independence revolutions and the modern struggles with political instability and economic dependence. The focus is on how the admixture of

European and New World inputs gave rise to unique Latin American cultures.

**HS 670 Selected Topics**
A study of selected issues of particular interest to the students and instructor. May be taken more than once.

**HS 695 Independent Study**
A planned program of individual study or research under the supervision of a member of the faculty.

## Humanities

**HU 651-658 Topics in Humanities**
A study of selected issues of particular interest to the students and instructor. May be taken more than once.

**HU 659 Writing and Speaking for Professionals**
A practical, tool-oriented approach for professionals who need to perfect writing and speaking skills for career advancement or presentations in graduate courses. Students generate work-related writing/speaking assignments and negotiate learning contracts based on editing, writing, and speaking methods related to individual needs and objectives. (See also E 659.)

**HU 695 Independent Study**
A planned program of individual study or research under the supervision of a member of the faculty.

## International Business

**IB 643 International Business**
Prerequisites: EC 601, MK609. An introduction to the political, economic, technological, and cultural settings of international business. Examines the problems, policies, and operational procedures of the multinational corporation, including the adjustment to foreign cultures and governments. Review of development, organization, and structure of the international firm.

**IB 644 Managing in Global Markets**
Prerequisites: EC 601, FI 601, MG 637, and MK 609. This course provides the student with an understanding of the effects of globalization on the economic environment and corporate operations. It examines the multinational's operations and the many adaptations management must undertake to successfully interact with the various global business environments. Topics will be examined from both domestic and international perspectives and will include the operational and strategic adjustments necessary for the multinational to navigate among the diverse and rapidly evolving cultural, political, economic, financial, operational, and ethical environments of global markets.

**IB 645 Comparative International Business Environments**
Prerequisites: IB 643, MK 609. A comparative approach to the study of the noneconomic aspects of foreign markets of several representative areas in the world. Focus on the interaction between the sociocultural environment of host nations and the multinational firm.

**IB 650 International Business Negotiating**
Prerequisite: IB 643. A description and analysis of the various stages involved in the international business negotiating process. Also, a survey of the different types of values and behaviors encountered in business negotiating. Case studies of representative countries are included.

**IB 651 International Marketing**
Prerequisites: IB 643, MK 609. The application of marketing principles and techniques in a global environment. A managerial approach to international marketing as it pertains to product policies, market channels, pricing, and advertising in a foreign market. Emphasis on marketing in different cultural settings.

**IB 652 Multinational Business Management**
Prerequisites: IB 643, MK 609. An examination of global strategy, ownership control, organization, and resource management. Major attention given to international risk analysis.

**IB 660 East and Southeast Asian Business Systems**
Prerequisites: IB 643 and MG 637. An analysis of the business systems of selected nations in East and Southeast Asia. Emphasis on the historical, political, and cultural underpinnings of business activity. Negotiating strategies and techniques to be used with selected East and Southeast Asian governments and firms.

**IB 670 Selected Topics**
A study of selected issues of particular interest to students and instructor. May be taken more than once.

**IB 690 Research Project**
Prerequisites: 15 graduate hours and permission of the instructor. Independent study under the supervision of an advisor.

**IB 693 Internship**
Prerequisites: six credits of IB concentration courses and approval of internship coordinator. A program of field experience in selected organizations in international trade and marketing.

**IB 695 Independent Study I**
A planned program of individual study under the supervision of a member of the faculty.

**IB 696 Independent Study II**
A continuation of Independent Study I.

**IB 698 Thesis I**
Prerequisite: 15 graduate hours. Periodic meetings and discussion of the individual student's progress in the preparation of a thesis.

**IB 699 Thesis II**
A continuation of Thesis I.

## Industrial Engineering

**IE 601 Introduction to Operations Research/ Management Science**
Prerequisite: IE 607. Introduction to the techniques and philosophies of management science and operations research. Includes linear programming, inventory analysis, queuing theory, dynamic programming, decision analysis, and other modeling techniques.

**IE 604 Management Systems**
Techniques of industrial and governmental systems management, including general systems and organizational theory.

**IE 607 Probability Theory**
Prerequisite: M 610 or equivalent. Probability of events. Random variables and expectations; discrete and continuous distributions; important standard distributions and applications; moment generating functions; central limit theorem.

**IE 609 Descriptive and Inferential Statistics**
Prerequisite: IE 607 or equivalent. Inferential statistical designs, including basic statistical tests and analysis of variance. Statistical theories and application of correlation analysis, multiple linear regression, nonlinear regression, and analysis of co-variance.

**IE 611 Decisions in Operations Management**
Prerequisites: MG 637 and QA 604, or equivalents. Study of organizations as systems producing goods and services. Review of concepts, functions, and basic techniques as applied to operations management. Examination of new trends and developments such as just-in-time, synchronous manufacturing, quality management, cycle-time reduction, and concurrent engineering. Emphasis on interrelations of different operational decisions on the final product and competitive position of the organization.

**IE 612 Managerial Interactions I**
An interdisciplinary systems approach to human behavior in organizations with emphasis on the impact of industrial engineering methods on organizational performance. Deals with individual motivation and face-to-face interaction in managerial roles.

**IE 613 Managerial Interactions II**
Prerequisite: IE 612. Continuation of IE 612. Organizational development, job enrichment, and modern work attitudes.

**IE 614 Data Information Systems**
Prerequisites: CS 604, CS 610 or equivalent, IE 604. Introduction to automated information systems planning and operations and their impact on management decision making, control functions, and communication capabilities. An overview of concepts and procedures with applications in urban environments, large organizations, and governmental agencies. Techniques presented include PERT/ CPM, Gantt charting, cost-benefit analysis.

**IE 615 Transportation and Distribution**
Prerequisite: IE 601 or equivalent. Introduction to transportation science with emphasis on physical distribution problems. Survey of operations research models and optimization strategies and their roles in transportation systems management.

**IE 621 Linear Programming**
Prerequisite: IE 601 or equivalent. Thorough coverage of the techniques and applications of linear programming. Special simplex forms and optimality conditions, duality, and sensitivity are covered. Applications to network flow problems.

**IE 622 Queuing Theory**
Prerequisite: IE 601 or equivalent. Elements of queuing theory including finite and infinite cases. Single server and multiple server parallel channels/series queues and special cases are analyzed.

**IE 623 Decision Analysis**
Prerequisite: IE 609 or equivalent. Decision theory, game theory; benefit-cost analyses under uncertainty; advanced engineering economic analysis.

**IE 624 Quality Analysis**
Prerequisite: IE 609 or equivalent. Concepts of quality and statistical quality analysis. Sampling techniques and decision processes.

**IE 625 Advanced Mathematical Programming**
Prerequisite: IE 621. Advanced mathematical programming techniques. Integer programming, goal programming, and multiple objective linear programming techniques will be covered. Computer applications will be demonstrated.

**IE 643 Reliability and Maintainability**
Prerequisite: IE 609 or equivalent. The basic theory and methodology of reliability and maintainability, including application of discrete and continuous distributions and statistical designs. Reliability, estimation, structure models, and growth models.

**IE 651 Human Engineering I**
An introduction to the design of machines, jobs, and environments with consideration of ergonomic principles. Coverage of behavioral, anatomical, physiological, and organizational factors affecting performance, comfort, and safety.

**IE 652 Human Engineering II**
Prerequisite: IE 651 or equivalent. Continuation of IE 651. In-depth analysis of selected topics in ergonomics, including work physiology, anthropometry, and signal detection theory. Laboratory experiments and reports included.

**IE 655 Manufacturing Analysis**
Prerequisites: undergraduate courses in manufacturing or manufacturing work experience and consent of instructor. The principles of the theory of metal cutting and metal working for improving the manufacturing operations involving metal machining and metal working. An opportunity for students to thoroughly understand the experimental approaches used in manufacturing.

**IE 661 Facility Infrastructure**
An overview of facilities planning and design considerations, with an emphasis on service and non-manufacturing facilities. Coverage includes facilities planning approaches and procedures, ergonomic considerations, access and accommodation issues, flow of people and materials, facility services, and facility flexibility and adaptability.

**IE 671 Current Topics in Operations Research**
Prerequisite: IE 601 or permission of instructor. An examination of new developments or current practices in operations research. A topic will be selected for thorough study. Possible subject areas include nonlinear programming, network theory, scheduling techniques, specialized techniques, specialized applications. Content may vary from trimester to trimester.

**IE 672 Current Topics in Industrial Engineering**
Prerequisite: IE 601 or permission of the instructor. An examination of new developments or current practices in industrial engineering. A topic will be selected for thorough study. Possible subject areas include reliability, production engineering, human factors, specialized applications. Content may vary from trimester to trimester.

**IE 681 System Simulation**
Prerequisite: IE 601 or permission of the instructor. Methods of modeling and simulating man-machine systems. Thorough coverage of discrete event simulation. Random number generators and variate generations discussed. Use of a simulation package and several projects will be required.

**IE 682 Advanced System Simulation**
Prerequisite: IE 681 or equivalent. Emphasis will be on model building and on design and analysis of simulation experiments for service and manufacturing systems. Student projects in real environments are required.

**IE 683 Systems Analysis**
Prerequisites: IE 601, IE 609 or equivalent, IE 614. Techniques and philosophies defining the concept of systems analysis presented in detail, illustrated with large-scale case studies. Diverse systems are analyzed covering the social, urban, industrial, and military spheres. Techniques include utility theory, decision analysis, and technological forecasting.

**IE 685 Theory of Optimization**
Prerequisite: IE 601. Methods of nonlinear optimization and programming. Search methods including golden section and dichotomous; constrained and unconstrained optimization including Rosenbrocks and Fletcher-Powell algorithms. Penalty and barrier function methods.

**IE 686 Production and Inventory Analysis**
Prerequisites: IE 601; IE 607 or equivalent. Inventory theory and models and their applications to production and operations. Methods of production including Kanban systems, JIT, MRP and their relations to fundamental inventory techniques with computer applications.

**IE 687 Stochastic Processes**
Prerequisite: IE 601 or equivalent. The theory and application of discrete and continuous-time stochastic processes. Areas of application include queuing, inventory, maintenance, and probabilistic dynamic programming models.

**IE 688 Design of Experiments**
Prerequisite: IE 609 or equivalent. Principles of modern statistical experimentation and practice in use of basic designs for scientific and industrial experiments; single factor experiments, randomized blocks, Latin squares; factorial and fractional factorial experiments, surface fitting designs.

**IE 690 Research Project**
Prerequisites: 15 graduate hours and permission of the program coordinator. Independent study under the guidance of an advisor in an area of mutual interest, such study terminating in a technical report of academic merit. Research may constitute a survey of a technical area in industrial engineering or operations research or involve the solution of an actual or hypothetical technical problem.

**IE 695 Independent Study I**
Prerequisite: permission of the program coordinator. Independent study under the guidance of an advisor in

an area designated by the program coordinator.

**IE 696 Independent Study II**
A continuation of Independent Study I.

**IE 698 Thesis I**
Prerequisite: 15 graduate hours. Periodic meetings and discussion of the individual student's progress in the preparation of a thesis.

**IE 699 Thesis II**
A continuation of Thesis I.

## Law

**LA 674 Business Law and the Regulatory Environment**
An overview of the legal system as it relates to the operation of a business. Topics will include those relating to the establishment and continuity of business relationships, including contracts, product liability, warranty, agency business entities, property, business crimes and torts, intellectual property, credit and bankruptcy, and those regulating business activities, including employment, environment, securities and antitrust laws.

## Logistics

**LG 660 Logistics Technology and Management**
Survey of modern logistics activities in both the commercial and military sectors. Theory of integrated logistics systems with applications to include customer-supplier relationships, inventory management, just-in-time and related procurement disciplines, spares and customer field support, transportation, warehousing, and physical distribution management. Quantitative and e-commerce tools are described in the context of corporate enterprise resource planning and logistics management.

**LG 663 Logistics in Acquisition and Manufacturing**
Managing logistics processes in purchasing, acquisition, and manufacturing. Optimizing logistics in complex, worldwide supply chains; in distribution systems designed for multiproduct, multiplant organizations; and in single-plant systems producing for the end customer. Designing customer support strategies and multimodal transportation interfaces.

**LG 664 Patents and Licensing in the Acquisition Process**
Supply chain management, purchasing, and product or service acquisition require a knowledge of patent law, licensing, and related international agreements. Current practice in patent law is described, together with ramifications for various industries including telecommunications and contract manufacturing.

**LG 665 Integrated Logistics Support Analysis**
Concepts of integrated logistics support in both the commercial and military sectors including logistics specialities, customer support, documentation needs, Internet applications, and system management on a worldwide basis. Introduction to reliability, maintainability, life cycle cost analysis, test and support capability, and warranty management.

**LG 669 Life Cycle Cost Analysis**
Theory and application of life cycle cost analysis applicable to both military and commercial decision support processes. Techniques for forecasting costs in future scenarios including economies of scale, upgrading, recycling, customer relationship support, training, and salvage and exit strategies. Application to new product development. Effectiveness over expected lifetime versus total life cycle cost.

**LG 670 Selected Topics**
A study of contemporary issues in logistics keyed to student and instructor interests. May be taken more than once.

**LG 690 Research Project**
Prerequisite: 15 graduate hours or permission of the instructor. Independent study under the supervision of an advisor.

**LG 695 Independent Study I**
A planned program of individual study under the supervision of a member of the faculty.

**LG 696 Independent Study II**
A continuation of Independent Study I.

**LG 698 Thesis I**
Prerequisite: 15 graduate hours. Periodic meetings and discussion of the individual student's progress in the preparation of a thesis.

**LG 699 Thesis II**
A continuation of Thesis I.

## Mathematics

**M 601 Mathematical Ideas**
This course is intended for students in the MS Education program. It surveys the development of mathematics through such key topics as geometry, trigonometry, abstract algebra, and the calculus. While topics may vary with individual instructors, all instructors will introduce students to the contributions of mathematics to civilization and give students some understanding of the discipline of mathematics.

**M 605 Biostatistics**
A non-calculus-based course which includes basic concepts of probability and statistics. These concepts are applied to problems in human biology, industrial/occupational health,

and epidemiology. Introduction to and use of the computer package SPSS for data analysis. (See also BI 605.)

### M 610 Fundamentals of Calculus

Prerequisite: M 115 (pre-calculus mathematics) or equivalent. Review of algebra and trigonometric functions. Topics from calculus, including differentiation and integration methods applied to problems in science, business, and the social sciences. A review of series.

### M 611 Matrix Theory and Its Applications

Prerequisite: undergraduate linear algebra or permission of instructor. Review of matrix algebra, systems of linear equations and rank; linear algebra in n-dimensions; inner product spaces and orthogonality; eigenvalues and eigenvectors; Hermitian, unitary, and normal matrices; quadratic and Hermitian forms. The course covers topics in matrix theory needed for significant applications in engineering and computer science.

### M 615 Linear Mathematics and Combinatorics

Prerequisite: M 610 or equivalent. Discrete mathematics topics used extensively in computer science, including linear algebra, graph theory, and combinatorics. Emphasis on applications to computer science.

### M 616 Applied Modern Algebra for Computer Science

Prerequisite: M 615. Advanced topics in logic and combinatorics as well as an introduction to discrete modern algebra and its applications to computer science.

### M 620 Numerical Analysis

Prerequisites: a minimum of 12 credit hours of undergraduate mathematics, including calculus and linear algebra; knowledge of a computer programming language such as Pascal, C programming, FORTRAN, or BASIC. Topics include solution of transcendental equations by iterative methods; solution of systems of linear equations (matrix inversion, etc.); interpolation, numerical differentiation, and integration; solution of ordinary differential equations.

### M 624 Applied Mathematics

Prerequisite: a minimum of 12 credit hours of undergraduate mathematics, including calculus and differential equations. Special functions; Fourier series and integrals; integral transforms (Fourier, Laplace, etc.) and their use in solution of boundary value problems.

### M 632 Methods of Complex Analysis

Prerequisite: graduate standing in engineering or mathematics. A study of the applications of the methods of complex variables to engineering and physical sciences. Includes analytic function theory, contour integration and conformal mapping.

### M 670 Selected Topics

Prerequisite: permission of the instructor. A study of selected topics of particular interest to the students and instructor. May be taken more than once.

### M 690 Research Project

Prerequisite: 15 graduate hours or permission of the instructor. Independent study under the supervision of an advisor.

### M 695 Independent Study I

A planned program of individual study under the supervision of a member of the faculty.

### M 696 Independent Study II

A continuation of Independent Study I.

### M 698 Thesis I

Prerequisite: 15 graduate hours. Periodic meetings and discussions of the individual student's progress in the preparation of a thesis.

### M 699 Thesis II

A continuation of Thesis I.

## Molecular Biology

### MB 601 Protein Biochemistry and Enzymology

Prerequisites: undergraduate organic chemistry and biochemistry. This course examines the relationship between protein structure and function. Topics included are properties of amino acids, peptides and proteins, peptide synthesis, protein isolation and sequencing, aspects of protein folding, protein-protein and receptor ligand interactions, enzyme kinetics, and enzyme regulation.

### MB 602 Biochemistry of Bioenergetics

Prerequisite: undergraduate organic chemistry. This course is strongly recommended for students lacking undergraduate biochemistry. Examination of the major anabolic and catabolic pathways and their regulation. Catabolic pathways for the oxidation of hexoses, lipids, and amino acids are considered. These processes lead to the formation of a chemiosmotic gradient capable of driving ATP synthesis. Discussion of the anabolic pathways starts with the generation of a similar chemiosmotic gradient by light absorption or other energy-releasing pathways leading to production of carbohydrates, lipids, amino acids, and nucleotides.

### MB 603 Nucleic Acid Biochemistry

Prerequisites: undergraduate organic chemistry and biochemistry. Examines the biochemistry of nucleic

acids, their function as genetic information and control over the expression of that information, nucleic acid-protein interactions, oncogenes and carcinogenesis.

### MB 606 Molecular Genetics/Genomics

Prerequisite: undergraduate molecular biology or biochemistry. The course combines information from the most recent genomic projects with traditional genetic research methods to provide novel understanding of the role of the genome as the blueprint of life. Emphasis is placed on exploring the expression of genes in the context of the activity and function of the whole genome. Topics include genome anatomy, functional genomics, regulation of the activity of genome, genome evolution, poteomics, genome engineering, and computational genomics.

### MB 607 Cellular Biology

An introduction to cellular structure and function. Examination of the role of biological membranes in cellular activity and forming functional compartments within organelles. The function of other cellular and extracellular structures, such as cytoskeleton and extracellular matrix. Additional topics include receptor structure and function, cellular signalling, differentiation, and motility.

### MB 608 Evaluation of Scientific Literature

Prerequisite: undergraduate genetics or molecular biology or biochemistry. This course will introduce the student to the organization, use, and critical evaluation of scientific information. Print and electronic resources will be explored through lectures, class discussion, and written assignments. Sources evaluated will include basic reference works, journal articles, electronic databases, and the variety of information accessible via the World Wide Web. Upon completion of the course, students will have the ability to locate, retrieve, and critically evaluate information sources for further coursework and research. In addition, they will be able to write their own scientific proposals.

### MB 609 Data Analysis in the Environmental and Biological Sciences

Prerequisites: 9 graduate hours and a previous course in statistics, or permission of instructor. The application of data analysis techniques in the environmental (applied ecology, environmental geology and chemistry) and biological (molecular biology, toxicology) sciences. These include applied univariate and multivariate statistics as well as geostatistical and non-detect methods. Extensive use of different types of computer software for data analyses.

### MB 611 Molecular Biology of Proteins with Laboratory

Prerequisites: MB 601 or undergraduate molecular biology and biochemistry. Techniques for working with proteins that are basic to the cell and molecular biologist and extend beyond the understanding of basic protein biochemistry. Course provides a theoretical understanding of methods commonly utilized for protein/peptide analysis. In the laboratory, students will isolate proteins from various tissues or expression systems and analyze them by one- and two-dimensional polyacrylamide gel electrophoresis. 4 credits; laboratory fee

### MB 613 Molecular Biology of Nucleic Acids with Laboratory

Prerequisites: MB 603 or permission of the instructor. An examination of gene expression and the techniques available for manipulating DNA and RNA. This course utilizes an intense laboratory component to instruct students in the practical and technical aspects of working with nucleic acids. 4 credits; laboratory fee

### MB 617 Cell Culture Techniques with Laboratory

Prerequisite: undergraduate cell biology or biochemistry or molecular biology. An intensive laboratory course designed to provide the student with basic skills and understanding required for mammalian cell and tissue culture and fundamental techniques in cell biology. Topics will include aseptic technique, the culture environment, primary culture, maintenance of cultures, cloning and selection of cell phenotypes, proliferation and apoptosis assays, tumorigenicity assays and experimental design. 4 credits

### MB 620 Bioinformatics

Prerequisites: MB 606 or permission of the instructor; students must have access to email prior to the first class. Students will learn how computers and information technology are changing the way biology is done. After reviewing genome structure, gene expression, and the history of the Human Genome Project, the course will cover experimental acquisition of DNA and protein sequence data, DNA sequence and mapping databases, sequence analysis and database searching, gene similarity and homology, protein structure, and protein evolution. Students will gain practical experience using computer applications essential to current biological research.

### MB 625 Advanced Bioinformatics

Prerequisites: MB 606 Molecular Genetics/Genomics and MB 620 Bioinformatics and CS 622 Database Systems as corequisite. The aim of this course is to provide students with a detailed overview of the latest computational and scientific developments in bioinformatics. Students will use a broad set of bioinformatics

software tools and will gain a comprehensive introduction to the theory upon which these tools are based. Students will develop new bioinformatics applications by using real biological data and Perl language. Topics include novel data storage and handling techniques, pattern search techniques through GCG package, development and implementation of new bioinformatics applications using Perl language, analysis of biomolecular structures, dynamics and functions, and analysis of novel gene expression methods (DNA microarray technology and serial analysis of gene expression- SAGE).

**MB 636 Immunology**
Study of the immune response in animals including cells and organs of the immune system, immunogens, MHC, cytokines, TCR, antibodies and complement.

**MB 644 Cellular Development**
Prerequisite: MB 607. The course covers control of differentiation and development at the cellular level. Topics include cell cycle control, embryological development, programmed cell death, wound healing, and chronic wounds.

**MB 648 Cytoskeleton and Extracellular Matrix**
Prerequisite: MB 607. The cytoskeleton provides cues for patterns of division and the molecular motors needed for cell motility. The extracellular matrix also contains cues for the cells that are differentiating, providing highly localized signals and pathways for cellular migration. This course examines the roles of the cytoskeleton and extracellular matrix in cellular movement, differentiation, and function.

**MB 650 Oncogenes and Cytokines**
Prerequisite: MB 607. The products of oncogenes induce cancer in animals and transformed phenotypes in cultured cells. Often the products are analogues of cytokines or cytokine receptors. This course examines oncogenes and their role in transformation, cell cycle control, and cellular differentiation.

**MB 656 Receptor Effector Systems**
Prerequisite: MB 601 or MB 607. Cellular receptors and their effector systems are responsible for the ability of cells to detect and respond to stimuli. These proteins are of critical importance to the development of drugs to control the function of cells. This course examines the structure of receptors from ion channels to DNA binding proteins, followed by an examination of the signalling pathways that propagate the signal through the cell. Also covered: the design and interpretation of binding studies for receptor ligand interactions.

**MB 670 Selected Topics**
Prerequisite: permission of instructor. An examination of topics of special interest to students and faculty. May be taken more than once.

**MB 680 Graduate Seminar**
Prerequisite: permission of instructor. Weekly discussions of current scientific literature and student and faculty research projects. May be taken more than once. 1 credit

**MB 688 Internship I**
Prerequisite: permission of instructor. Laboratory and research experience will be developed under the supervision of an outside researcher. A portion of the internship must be devoted to the completion of a research report. The instructor will monitor the student's progress through regular meetings and evaluation of the final report.

**MB 689 Internship II**
A continuation of Internship I.

**MB 690 Research Project**
Prerequisite: permission of instructor. An independent research project/program under the supervision of a membet of the faculty.

**MB 695 Independent Study I**
Prerequisite: permission of instructor. A planned program of independent study under the supervision of a member of the faculty.

**MB 696 Independent Study II**
A continuation of Independent Study I.

**MB 698 Thesis I**
Prerequisites: 15 graduate hours and permission of coordinator. Supervised preparation of a thesis describing the student's research.

**MB 699 Thesis II**
A continuation of Thesis I.

## Mechanical Engineering

**ME 602 Mechanical Engineering Analysis**
Topics in vector calculus and complex variables. Solution of partial differential equations as applied to mechanical engineering.

**ME 604 Numerical Techniques in Mechanical Engineering**
Prerequisite: knowledge of C programming or FORTRAN. Review of matrix algebra and simultaneous equations. Numerical integration and differentiation. Numerical methods for differential equations including techniques such as Euler, Runge-Kutta, Milne, shooting, Crank-Nicolson, and FEM. Emphasis on numerical solutions to ordinary and partial differential equations relevant to mechanical engineering.

**ME 605 Finite Element Methods in Engineering**
Prerequisite: ME 604. Basic concepts underlying the FEM. Displacement and weighted residual formulations of the finite element approach to numerical solutions. Applications to one- and two-dimensional problems in areas such as elasticity, heat transfer, and fluid mechanics.

**ME 610 Advanced Dynamics**
Kinematics and dynamics of single particles and systems of particles. Lagrange's equations. Hamilton's principle, and canonical transformation theory. The inertia tensor and rigid body motion.

**ME 611 System Vibrations**
Advanced techniques for analysis of vibrations in mechanical systems. Multiple degrees of freedom and random noise inputs among topics covered.

**ME 613 Fundamentals of Acoustics**
Basic theory of acoustics in stationary media; plane, cylindrical, and spherical waves; reflection, transmission, and absorption characteristics; sources of sound; propagation and attenuation in ducts and enclosures.

**ME 615 Theory of Elasticity**
Index notation; Cartesian tensors and coordinate transformation; stress tensor and field equations; analysis of stress and strain in two and three dimensions; Airy stress function; applications to problems of torsion and bending; experimental methods.

**ME 620 Classical Thermodynamics**
Phenomenological equilibrium and nonequilibrium thermodynamics. Formulation and application of fundamental laws and concepts; chemical thermodynamics.

**ME 625 Mechanics of Continua**
Tensor analysis, stress vector and stress tensor, kinematics of deformation, material derivative, fundamental laws of continuum mechanics, conservation theorems, constitutive laws, and representative applications.

**ME 627 Computer-Aided Engineering**
Prerequisite: consent of instructor. Integration of computers into the design cycle. Interactive computer modeling and analysis. Geometrical modeling with wire frame, surface, and solid models. Finite element modeling and analysis. Problems solved involving structural, dynamic, and thermal characteristics of mechanical devices.

**ME 630 Advanced Fluid Mechanics**
Advanced topics from among the following areas: perfect fluids, viscous fluids, turbulence, boundary layer theory, surface phenomena, shock waves, and gas dynamics.

**ME 632 Advanced Heat Transfer**
Review of the basic concepts of conduction and radiation. Detailed treatment of laminar, turbulent, free, and forced convectional flows. Computer projects.

**ME 633 Convection Heat Transfer**
Prerequisites: ME 602, ME 604 corequisite, consent of the instructor. The fundamentals of convection heat transfer presented in a level that requires a good knowledge of partial (and ordinary) differential equations and a level of proficiency in numerical analysis.

**ME 635 Dynamic Systems and Control**
Introduction to the modeling of dynamic systems. Emphasis on the analysis of first and higher order continuous-time linear models. Feedback techniques with examples from various branches of mechanical engineering.

**ME 638 Measurement and Instrumentation in ME**
Measurement principles, including error analysis. Instrument systems: sensing, transmitting and terminating devices. Typical systems and devices for measuring motion, force, stress, strain, pressure, flow and temperature.

**ME 642 Combustion**
Prerequisites: ME 620, ME 630, ME 632, and consent of the instructor. Review of chemical kinetics. Explosive and oxidative characteristics of fuels. Premixed combustible gases. Detonations and deflagrations. Diffusion flames. Non-volatile fuels. Ignition.

**ME 645 Computational Fluid Dynamics and Heat Transfer**
Prerequisites: ME 604, ME 630. Current methods of computer solutions of the conservation equations of fluid dynamics. Viscous, incompressible, compressible, and shock flows. Real gas equations of state. Computer projects.

**ME 647 Two-Phase Flow**
Prerequisites: ME 620, ME 630, ME 632, or consent of the instructor. An introduction to the thermophysics of phase change phenomena in general with specific treatment to the dynamic behavior of interfaces and to the vaporization and condensation processes in heat transfer equipment.

**ME 651 Microscale Energy Transfer**
Prerequisites: ME 610, ME 620, ME 630, ME 632, and consent of the instructor. Microscale Energy transport in fast transient regimes in solids. Interfaces, liquid films, etc. Melting

and freezing phenomena, Microscale radiation, Interfacial forces, Micro heat pipes.

**ME 655 Interfacing Mechanical Devices**
Prerequisite: knowledge of C programming. Interfacing the real world of mechanical devices to a stand-alone PC. How to write C programs for monitoring and control of DC motors, encoders, stepper motors, AC heaters, and AC fans. Practical uses of thermal, mechanical, optical, and Hall Effect sensors.

**ME 670 Selected Topics**
Prerequisite: permission of the instructor. A study of selected topics of particular interest to the students and instructor. May be taken more than once.

**ME 690 Research Project**
Prerequisites: 15 graduate hours and wtitten permission of program coordinator. Independent study under the guidance of a faculty advisor, such study tetminating in a technical report of academic merit. Research may constitute a survey of a technical area in mechanical engineering or involve the solution of an actual or hypothetical technical problem.

**ME 695 Independent Study I**
A planned program of individual study under the supervision of a member of the faculty.

**ME 696 Independent Study II**
A continuation of Independent Study I.

**ME 698 Thesis I**
Prerequisite: 18 graduate credit hours. Periodic meetings and discussions of the individual student's progress in the preparation of a thesis.

**ME 699 Thesis II**
A continuation of Thesis I.

## Management

**MG 610 The Sports Industry**
Prerequisite: MG 637. Focuses on management concepts and business skills as they relate to the sports industry. An in-depth look at the organizational structure and method of operation of major sectors of the sport enterprise; examination of important contemporary issues in the sports industry.

**MG 611 Sports Industry Marketing, Promotion, and Public Relations**
Prerequisite: MK 609 or permission of instructor. A study of marketing, promotion, and public relations strategies utilized in various aspects of the sports industry. Marketing sport as a product and marketing of non-sport products using sport as a promotional tool are examined.

**MG 612 Sports Law**
An analysis of contract law, tort law, antitrust law, labor law, collective bargaining, and administrative law as they apply to sport. Provides sport managers with the fundamental legal knowledge necessary to operate in the increasingly complex sport environment.

**MG 613 Sports Facility Management**
Prerequisite: MG 637 or permission of instructor. An examination of how sports facilities such as coliseums, municipal and college stadiums, and multipurpose civic centers are managed. Among the topics included: booking and scheduling of events, box office management, staging and event production, personnel management, concessions and merchandising management.

**MG 617 Applied Fiscal Management for Sports and Facility Managers**
Prerequisite: A 620 or permission of instructor. An examination of legal, managerial, accounting, and financial issues confronting sports, fitness, and recreation industry managers. Issues covered include tax law, bankruptcy, inventory management, capital instruments, accounting principles, financial statements, industry ratios, securing funds, and related concepts that help determine the viability and strength of businesses in the sports industry. The focus of the material is on how to apply basic financial management concepts to managerial decision making.

**MG 618 College Sports Administration**
The major objective of this course is to provide students with knowledge of the day-to-day operations of a collegiate athletic department. Through case studies, class projects, guest lectures, and on-site visits, students will acquire the practical skills needed to manage a staff of coaches, administrators, student athletes, and other staff. The activities of facility operations, travel, compliance, eligibility, financial aid, personnel, ticket operations, sports camps, and institutional control will be examined.

**MG 626 Design and Implementation of Benefit Systems (New Course)**
This course provides an overview of the issues, processes, successful practices, and policies involving benefit administration. The focus will be on managing benefit administration and its relation to strategic business planning. Topics include innovative welfare plan design, defined benefit systems, ERISA law, HRIS and other related automated processes. Students will acquire a basic working knowledge of welfare benefit plans,

defined benefit systems, retirement plans, and recent innovations in consumer-driven healthcare and associated laws. Emphasis will be placed on determining the impact of benefit policies on business profitability.

### MG 627 Human Resource and Financial Decision Making

This survey course focuses on basic financial concerns that impact HR and how an HR manager can become a more active participant in the boardroom through having a strong grasp of concepts such as payroll, taxes, budgeting, benefits, compensation, and deferred compensation administration.

### MG 628 Building a Consulting Business

How to establish, manage and maintain a consulting practice. Topics include: financing, marketing, client contacts, legal and accounting issues, and networking.

### MG 630 Management Information Systems in Health Care

The use of computers in the health care field. Review of the history of information systems and their application in health care settings. Survey of problems and issues inherent to health care information management.

### MG 637 Management Process

A study of the traditional functions of management: planning, organizing, directing, controlling, and coordinating, along with an analysis of human behavior in organizations and the exploration of new paradigms in business and management systems.

### MG 640 Management of Health Care Organizations

Identification of the characteristics of health care organizations and the dimensions of management in such organizations. Examination and application of the principles of management necessary for the successful operation of health care organizations.

### MG 645 Management of Human Resources

Prerequisite: MG 637 or P 619 or PA 601. A study of organizational practices in the management of human resources. Manpower planning, recruitment, selection, training, compensation, and contemporary problems of the field.

### MG 650 Entrepreneurship

Prerequisites: FI 601, MG 637, and MK 609. Deals with the establishment of a new business venture, covering such topics as site development, market analysis, staffing, inventory control, personnel relations, and funding.

### MG 655 Corporate Governance and Business Strategy

Prerequisite: MG 637. The primary participants who determine the direction and performance (i.e., governance) of corporations are the shareholders, the management, and the board of directors. The rights, obligations, and impacts of these direct participants in corporate governance are explored along with the roles that various corporate constituents can, do, and should play in determining corporate direction, strategy, and performance.

### MG 656 Integrating the Enterprise

Prerequisites: MG 637, FI 601, and MK 609. This course will focus on developing a systemic understanding of an enterprise, integration of its functional parts as a cornerstone of its sustained competitive advantage, and creation of its unique business model to achieve it.

### MG 662 Organization Theory

Prerequisite: MG 637. A survey of the literature on theories of organization with emphasis on contemporary theories. Application of the theories to management and organizational problems will be attempted. Difficulties arising between theory and practice will be examined.

### MG 663 Leadership and Team Building

Prerequisite: MG 637 or P 619 or PA 625. Examination of the impact of theories and research findings relevant to leadership and team building in organizations. The role of the leader and teams in organizations; the knowledge and skills required for successful leadership and team building. Assessment of one's own leadership and team-building capabilities.

### MG 664 Organizational Effectiveness

Prerequisite: MG 637 or P 619 or PA 625. Identification of the criteria necessary for developing and maintaining effective organizations. A study of the concepts that may be utilized in the management of these criteria. Approaches that may be examined and applied to problem situations through cases and role playing.

### MG 665 Compensation Administration

Prerequisites: EC 625; MG 645 or P 620. A study of the compensation function in organizations. Establishing wages and salaries, fringe benefits, and incentives.

### MG 667 Multicultural Issues in the Workplace

Prerequisite: MG 637 or P 619. Overview of theory and practice of diversity in the workplace; examination of the impact of changing workforce demographics on current and future productivity and competitiveness of organizations. Various forms of bias; methods for overcoming negative impact. Implementation of diversity programs; self-awareness of

attitudes and behavior toward diverse groups. Issues addressed include gender, race, age, religion, sexual orientation, physical ability, veteran status.

**MG 669 Strategic Management**
Prerequisites: completion of all core and at least four of the advanced courses in the MBA curriculum. This course examines management policies and strategies for the complex organization operating in a dynamic environment, from the viewpoint of top-level executives of the organization. It also develops analytic and systemic frameworks for the management of numerous elements involved in assuring the fulfillment of the goals of the total organization and integrates the student's general business knowledge with knowledge acquired in the MBA curriculum. Emphasis on development of oral and written skills by examination and discussion of cases and by other appropriate instructional methods. Completion of a significant project is required as part of this course.

**MG 670 Selected Topics**
A study of selected issues of particular interest to students and instructor. May be taken more than once.

**MG 671 Employment Law**
Prerequisite: MG 645. This course is designed to provide the student with a general understanding of the nature and intent of the various state and federal statutes governing the employment relationship. Topics like race and gender discrimination in the workplace, disability issues, the investigation of sexual harassment claims, workplace safety and health compliance, employee privacy issues, employee discharge and discipline procedures, the employment of aliens, and the nature of employee rights will be analyzed in detail.

**MG 678 Personnel Management Seminar**
Prerequisites: EC 625, MG 637 or P 619, MG 645 or P 620. A seminar in the personnel and manpower management function of the modern work organization. The use of an integrated behavioral, quantitative, and systems approach permits an applied multidisciplinary synthesis of the various aggregate manpower management subsystems required in the modern work organization.

**MG 680 Current Topics in Business Administration**
Prerequisite: 15 graduate hours or permission of the instructor. An integrative course examining the role of business in society and relating the business firm to its social, political, legal, and economic environments. While the exact content of this seminar is expected to vary from trimester to trimester in accordance with the varied academic interests and professional backgrounds of different faculty handling the course, the basic theme is the role of the business firm as the "keeper" of the market mechanism and the means for organizing resources in the economy.

**MG 686 Global Business Simulation**
Prerequisite: Completion of courses in Accounting, Marketing and Finance. This course is a business strategy simulation where teams of students run a company in a head-to-head competition against companies run by other class members. The company operations parallel those of actual companies operating globally in the same industry.

**MG 690 Research Project**
Prerequisite: 15 graduate hours or permission of the instructor. Independent study under the supervision of an advisor.

**MG 694 Internship**
Prerequisite: 24 credits of graduate work. An on-the-job learning experience with a selected organization, arranged for course credit and under the supervision of a faculty advisor. 3 or 6 credits

**MG 695 Independent Study I**
A planned program of individual study under the supervision of a member of the faculty.

**MG 696 Independent Study II**
A continuation of Independent Study I.

**MG 698 Thesis I**
Prerequisite: 15 graduate hours. Periodic meetings and discussion of the individual student's progress in the preparation of a thesis.

**MG 699 Thesis II**
A continuation of Thesis I.

**MG 801 Dissertation I**
Enrollment limited to doctoral students only. Prerequisite: successful completion of the written and oral doctoral comprehensive examination. Periodic meetings and discussion of the individual student's progress in the preparation of the doctoral dissertation.

**MG 802 Dissertation II**
Enrollment limited to doctoral students only. Continuation of Dissertation I.

**MG 803 Dissertation III**
Enrollment limited to doctoral students only. Continuation of Dissertation II.

**MG 804 Dissertation IV**
Enrollment limited to doctoral students only. Continuation of Dissertation III.

## Marketing

### MK 609 Marketing
An intensive study of modern marketing fundamentals in a diverse, global economy; study of the decision-making problems encountered by marketing managers, using lectures and case studies.

### MK 616 Buyer Behavior
Prerequisite: MK 609. An examination of the principal comprehensive household and organizational buyer behavior models and the behavioral science theories on which such applied models are based. Analysis of the buyer at the individual level, at the social level, and at the organizational level.

### MK 632 Nonprofit and Services Marketing
Prerequisite: MK 609. An examination of the service product in for-profit and not-for-profit organizations. Unique tools for analysis of service quality and the service encounter, including the roles of the customer and the service provider in service production, service expectations and scripts, and positioning. Communication and management strategies for service expectations, demand management, and organizational flexibility.

### MK 638 Competitive Marketing Strategy
Prerequisites: MK 609 plus three additional graduate credits in marketing. Focuses on product, price distribution, and promotion strategies that will give a company a competitive advantage. Also, corporate self-appraisal, market segmentation, and competitor evaluation.

### MK 639 Marketing Research and Information Systems
Prerequisites: MK 609, QA 604. A managerial approach to marketing information flow, including recognition of information needs and an overview of marketing research as part of an information system. Special attention to evaluation of research design and measurement methods, effective utilization of research output, and problems encountered in establishing a marketing information system.

### MK 641 Marketing Management
Prerequisites: MG 637, MK 609. A case-based review of the basic decision-making problems in marketing management, with an emphasis on information gathering and strategy. Topics include both U.S. and international problems in product, promotion, distribution channels, sales management, and pricing. Cases will consider both physical products and services in the consumer and business-to-business environments.

### MK 643 Product Management
Prerequisites: MG 637, MK 609. The search for new product ideas and their evaluation; the organizational structure necessary for the development and introduction of new products and the management of a product line; the commercial aspects of product design, packaging, labeling, and branding; considerations involved in making product deletion decisions; and the social and economic effects of managing product innovation.

### MK 645 Distribution Strategy
Prerequisites: MG 637, MK 609. Analysis of channel strategies, theory and economic justification of distribution channels, direct and indirect methods of control, behavioral states of channel members, costing the channel, and management of changes in distribution.

### MK 670 Selected Topics
A study of selected issues of particular interest to students and instructor. May be taken more than once.

### MK 690 Research Project
Prerequisite: 15 graduate hours or permission of the instructor. Independent study under the supervision of an advisor.

### MK 693 Internship
Prerequisites: Six credits of MK concentration courses and approval of internship coordinator. A program of field experience in selected organizations in marketing and public relations.

### MK 695 Independent Study I
A planned program of individual study under the supervision of a member of the faculty.

### MK 696 Independent Study II
A continuation of Independent Study I.

### MK 698 Thesis I
Prerequisite: 15 graduate hours. Periodic meetings and discussion of the individual student's progress in the preparation of a thesis.

### MK 699 Thesis II
A continuation of Thesis I.

## National Security and Public Safety

### NSP 601 National Security Programs: Architecture and Mission
An inquiry into the nature and scope of the U.S. national security program's architecture. Areas covered include the current architecture, legal and regulatory basis, integrating national security programs into the agency's missions, developing security policies and strategies, and the oversight of the NSPs.

### NSP 602 NSP Personnel Security Programs
A study of the personnel security pro-

grams. Specific analysis of behavioral issues and their impact on loyalty and trustworthiness determinations. Students will study government clearance processes and will be submitted for a clearance at the secret level.

### NSP 603 National Security Charter, Legal Issues, and Executive Orders

An analysis of the legal framework, charter, and executive orders that guide the creation and operations of the U.S. intelligence community.

### NSP 604 Securing National Security Information Systems

A comprehensive introduction to network security issues, concepts, and technologies. The core technologies of access control, cryptography, digital signatures, authorization, network firewalls, and network security services are reviewed. Issues in security policy, risk management are covered.

### NSP 606 Contemporary Issues in National Security Programs

Students will select from a range of topics relating to current issues and concerns within the national security architecture. Each student will be required to write a paper and deliver an oral presentation on a selected topic.

### NSP 607 Architecture of Protected Information

Students will review contemporary theories and practices for the identification of information requiring or deserving protection and will evaluate how such protection may be achieved while allowing the use of the information. Contemporary legal principles and regulatory processes will be explored, in both private and governmental sectors. The application of sound information security practices will be reviewed, and program analysis models will be explored.

### NSP 610 NSP Cost Modeling and Contract Administration

An in-depth analysis of the federal acquisition process, costs of national security programs, and their role in meeting federal agencies' mission objective. Students will study the relationships among the federal acquisition process, budget planning, and national security programs.

### NSP 611 NSP Situational Evaluation and Failure Analysis Models

A comprehensive study of evaluation techniques and processes that measures scope and effectiveness of security programs. Students employ the use of situational analysis, failure analysis, case studies, and other research-oriented approaches.

### NSP 612 Integrated Studies in Safeguards and Countermeasure Designs

A study of the selection of safeguards and countermeasures in support of national security programs. Examines the relationships among protection needs, mission accomplishment, available safeguards, and countermeasures. Analysis of the impact of the protective architecture and reconciliation with the budgetary and human resource realities.

### NSP 613 NSP Issues in Research and Policy Analysis

An introduction to quantitative and qualitative methods used for research and policy analysis. Students will become familiar with basic types of research designs, survey research methods, evaluation methods, descriptive statistics, and inferential statistics, and their application to national security programs.

### NSP 620 Bioterrorism and Biodefense

This course provides a multidisciplinary approach to understanding terrorism employing biological pathogens specifically, and terrorism in general. A new topic in academia, it crosscuts many established academic areas. It comprises the history, origins, motivations, and techniques used by many terrorists; preparedness, detection, treatment, and response during pre-, trans-, and post-attack times; government programs to prevent, prepare for, and respond to; and legal, economic, mental health, and policy issues. Lecture, discussion, a writing assignment, and a tabletop decision-making simulation will be the teaching methods used. 1 credit

### NSP 621 National Security Incident Mapping

This course combines a variety of methods to introduce the various ways that terror risks can be analyzed, detected and prevented. In addition to the bio-terror tabletop exercise, the class will also involve a problem-based learning project focused on assessing risk on critical infrastructures in a nearby neighborhood. Students will be tasked with evaluating the various conceptual and technical tools available caused by terrorism, including crime mapping technology, crime risk assessments, and crime prevention through environmental design. The class will use the problem-based learning method in groups to tackle a specific set of real-life problems. This approach simulates real-life risk assessment and response scenarios since group decision-making and problem-solving process is an important part of assessing risk. Accordingly, students will be evaluated on how they organize their research and planning activities and cooperate in their groups. 2 credits.

### NSP 630 Risk Assessment and Management in National Security

This graduate level course provides a multidisciplinary approach to under-

standing the concept and nature of risk in society, currently and historically. One of the primary goals of the course is to assess the role that risk and uncertainty have played in the development of a wide variety of public and private approaches to recognizing and resolving risks of loss. Lecture, discussion, a writing assignment and several individual and team presentations will be included in the teaching methods used along with several semi-structured, student-led case studies.

### NSP 641 National Security World and National Threat Modeling

An analysis of threats, vulnerabilities, risks, and appropriate countermeasures that must be analyzed to model the United States world and national assessment strategy.

### NSP 642 Integrated Studies of the Intelligence and Counterintelligence Communities

An introduction to the history, theory, principles, and objectives of U.S. intelligence and counterintelligence operations. Analysis of the impact on national security programs and objectives.

### NSP 643 Seminar in Sensitive Evaluation, Techniques, Safeguards, and Countermeasures

Prerequisite: NSP 612. The analysis and study of the uses of classified techniques in national security programs, using the principles and techniques of the Integrated Studies in Safeguards and Countermeasure Designs course.

### NSP 644 Cross-Impact Analysis: National Security Futures Issues

This course is an advanced examination of the uses that can be made of the Cross-Impact Analysis methodology. Non-traditional, problem-solving evaluation of national security issues will be utilized. Emphasis will be on estimating the likelihood and nature of anticipated events that may influence projected factors. A multidisciplinary approach will be utilized. The focus of the course will be on the implementation of empirically derived strategies in the analysis of national security futures issues.

### NSP 645 National Security: Issues in Deception

To achieve and sustain high-performance during our National Security enterprise requires focus, discipline and imagination. It also requires thoughtful oversight, visionary leadership, and highly effective administration. The purpose is to provide students and security professionals with the opportunity to expand their knowledge and technology skills.

### NSP 646 The Structure of National Security Decisions

This graduate level course provides a multidisciplinary approach to understanding the intuitive, structured and deliberative nature of national security decisions. A global context, the limitations of the human mind along with political and organizational pressures combine to challenge national security decision makers. The purpose of this course is to bias the odds of a wise decision in the decision-makers' favor. Lecture, discussion, a writing assignment and several individual and team presentations will be among the teaching methods used. In addition, several partially structured, student-led case studies will be presented to drive the discussions.

### NSP 647 The Economics of National Security

This course explores the fundamental economic national security questions facing our society. How much of our national wealth is allocated currently to help ensure our national security? How and by whom is our national security budget determined? What is a life worth? How can a more cost-effective national security budget be achieved? These and other economic questions will be explored in this far-reaching examination of national security economics.

### NSP 648 Achieving Excellence in National Security Administration

This graduate course consists of a survey of the methods used by effective private sector managers and administrators to help ensure that their organizations achieve consistently high levels of performance. This survey will be supplemented by focused conversations about how these well-researched and practical methods could be applied to administrative challenges within the American national security enterprise. A lecture and discussion format will be followed, supplemented by student-led case studies.

### NSP 651 A Study of Designated Approving Authorities Criteria

This course provides comprehensive coverage of the elements pertaining to a study of Designated Approving Criteria in NSTISSI Standard 4012 and analyzes the information security functions of the designated approving authority.

### NSP 652 System Adminstration in Information Systems Security

This course provides comprehensive coverage of the elements pertaining to a study of System Administration in Information Security as promulgated by NSTISSI Standard 4013 and analyzes the minimal performance standards of system administrators.

**NSP 653 Information Systems Security Officers**
This course provides comprehensive coverage of the elements pertaining to a study of Information Systems Security Officers as promulgated by NSTISSI Standard 4013 (E) and analyzes the performance standards for the information system security officer at the entry, intermediate, and advanced levels.

**NSP 654 Information System Approval and Certification**
This course provides comprehensive coverage of the elements pertaining to the approval process for Information Systems and certifying authorities as designated by NSTISSI Standard 4015 and analyzes the INFOSEC functions of system certifiers.

**NSP 668 Weapons of Mass Destruction I: Chemical and Biological Agents**
An in-depth analysis of technological issues regarding protecting the public from biological and chemical agents that may be used as weapons of mass destruction (WMD).

**NSP 669 Weapons of Mass Destruction II: Radiological Agents**
Radiological materials pose a serious national security concern. This course will provide an in-depth analysis of the scientific, technological, and policy issues involved in providing protection from the misuse of these agents.

**NSP 670 Selected Topics**
A study of selected issues of particular interest to the students and instructor.

**NSP 680 Research Methods in National Security**
An introduction to social science research methods used in national security for purposes of undertaking intelligence analysis. Students will become familiar with basic types of research design; open source vs. classified research material, and will be exposed to qualitative and quantitative evaluation methods.

**NSP 690 Research Project I**
Individual guidance on a research endeavor.

**NSP 691 Research Project II**
Prerequisite: NSP 690. Individual guidance on a research endeavor.

**NSP 693 National Security Internship I**
Accepted candidates will be placed on summer assignments within an element (agency or industry) of the U.S. Government's national security program. The student's formal educational development will be complemented by field placement experience in various security settings or agencies. Field experience will be supervised by designated agency and department personnel.

**NSP 694 National Security Internship II**
Prerequisite: NSP 693. The student's formal educational development will be complemented by field placement experience in various security settings or agencies. Field experience will be supervised by designated agency and department personnel.

**NSP 695 Independent Study**
A directed independent learning experience, the topic and format to be agreed upon by the student and supervising faculty.

**NSP 697 Thesis I**
Prerequisite: 15 graduate hours. Approval of the instructor. Periodic meetings and discussions of the individual student's progress toward the completion of the thesis. This will include review of the literature and methodology (research design, survey instrument development, etc.). Minimum of six credits required (NSP 697 and NSP 698; NSP 699 optional at the discretion of the instructor).

**NSP 698 Thesis II**
Prerequisite: 15 graduate hours. Approval of the instructor. Periodic meetings and discussions of the individual student's progress toward the completion of the thesis. This will include review of the literature and methodology (research design, survey instrument development, etc.). Minimum of six credits required (NSP 697 and NSP 698; NSP 699 optional at the discretion of the instructor).

**NSP 699 Thesis III**
Prerequisite: 15 graduate hours. Periodic meetings and discussions of the individual student's progress toward the completion of the thesis. This will include review of the literature and methodology (research design, survey instrument development, etc.). Minimum of six credits required (NSP 697 and NSP 698; NSP 699 optional at the discretion of the instructor).

## Nutrition

**NU 601 Nutritional Biochemistry I: Fundamentals**
Prerequisite: undergraduate course in organic chemistry or introductory biochemistry. Lectures examine the structures, properties, and metabolism of four major classes of bioorganics (carbohydrates, lipids, proteins/amino acids, nucleic acids/nucleotides) with special attention to their biologic roles and nutritional aspects of their metabolism.

**NU 602 Nutritional Biochemistry II: Applications**
Prerequisite: NU 601. Lectures emphasize integration and control of

metabolic pathways and also survey certain areas of biochemistry and molecular biology with their interconnections with genetics, disease, and patient management, including dietary modifications.

### NU 603 Nutritional Physiology

Prerequisites: undergraduate course in organic chemistry or introductory biochemistry plus a course in human physiology or cell biology. Selected tissue/organ systems and their specific relation to nutrition. Overview of renal physiology, the endocrine system, essentials of gastrointestinal tract physiology, cardiovascular system, excitable tissues (nerve and muscle), cell physiology, cell membranes, and transport functions.

### NU 604 Vitamin Metabolism

Prerequisites: NU 601, NU 603. Study and integration of the chemistry, biochemistry, physiology, pharmacology, and nutritional aspects of vitamin metabolism in humans. Chemical nomenclature, structure-function relationships; structural analogs and antagonists; methods and principles of measurement and assessment of status; food sources; digestion; absorption; transport; tissue uptake and distribution; intracellular metabolism; storage; excretion; biochemical function(s); correlation of clinical features of excess and deficiency with metabolic roles; vitamin-nutrient and vitamin-drug interactions; the role of vitamins in therapeutics and prophylaxis.

### NU 605 Mineral Metabolism

Prerequisites: NU 602, NU 604. Study and integration of the chemistry, biochemistry, physiology, and nutritional aspects of mineral metabolism in humans. Chemical forms; structural analogs and antagonists; methods and principles of measurement and assessment of status; food sources; digestion; factors influencing bioavailability; absorption; transport; tissue uptake and distribution; intracellular metabolism; storage; excretion; biochemical function(s); correlation of clinical features of excess and deficiency with metabolic roles; mineral-nutrient and mineral-drug interactions; and the role of minerals in therapeutics and prophylaxis.

### NU 606 Cell and Molecular Biology of Human Nutrition

Prerequisite: NU 601 or permission of instructor. The relationship of nutritional science to the flow of information from DNA to protein. DNA replication, mutation, control of transcription and translation, signal transduction, the cell cycle, and genetic engineering.

### NU 609 Research Methodology in Nutrition

The course focuses on understanding the methods of nutrition research. Topics include advantages/disadvantages of various study designs; tools used in dietary assessment; measurement and interpretation; concepts and applications in nutrition from biostatistics and epidemiology.

### NU 610 Nutrition and Disease I

Prerequisites: NU 602, NU 604. Discussion of certain disorders having nutritional implications; particular emphasis on the etiology and pathogenesis (including dietary factors), as well as diagnosis and treatment approaches (past and current). Rationales for inclusion of dietary alterations in the prophylactic and therapeutic approaches. Disorders include renal disease and hypertension; atherosclerosis and cardiovascular disease; energy balance, obesity, and eating disorders; cancer.

### NU 611 Nutrition and Disease II

Prerequisites: NU 602, NU 604. Continuation of discussion of nutritionally related disorders begun in NU 610: diabetes mellitus; gastrointestinal disorders, hepatobiliary disease; acquired immune deficiency syndrome (AIDS); arthritis; osteoporosis; trauma and infection in the critically ill; other disorders, depending on significance and student interest.

### NU 612 Nutrition and Health: Contemporary Issues and Controversies

Prerequisite: NU 605. Application of nutritional science to the maintenance of good health and body function after childhood. Topics will vary with student/faculty interests and current issues in nutritional science.

### NU 613 Maternal and Child Nutrition

Prerequisite: NU 605 or permission of program director. Physiology of pregnancy; maternal nutrition and outcomes of pregnancy, at-risk pregnancies: teratogens and teratogenic effect of nutrient deficiency or excess; nutrition and lactation, breast milk vs. formulas; nutrition and fertility; nutrition in growth and development; infant feeding and nutrition; nutrient needs of children.

### NU 614 Public Health Nutrition and Assessment

Prerequisite: NU 605. Interface between nutritional science and the broad area known as public health. Quantity, quality, and safety of the food supply; food additives and labeling; regulatory agencies; research approaches to food, nutrition, and disease; procedures used in nutritional assessment of individuals.

### NU 615 Nutrition and Exercise for Performance and Health

Prerequisites: introductory lecture course in biochemistry plus anatomy and physiology. The role of nutrition and physical activity in health promotion, disease prevention, and sports

performance. Topics include exercise energetics, physiological responses, and training adaptations; ergogenic aids for performance enhancement; assessment of body composition and physical fitness; behavioral management for exercise adherence; effectiveness of physical activity on chronic disease prevention and treatment; and development of exercise prescriptions for clinical populations.

**NU 670 Selected Topics**
Prerequisite: 15 graduate hours or permission of program director. A study of selected issues of particular interest to the students and instructor.

**NU 690 Research Project**
Prerequisite: 15 graduate hours or permission of program director. Independent research/project carried out under the supervision of a faculty advisor and resulting in a written research report in the area of human nutrition.

**NU 693 Human Nutrition Internship I**
Prerequisite: Bachelor of Science degree in food, nutrition, or dietetics. The Dietetic Internship program provides between 600 and 1700 hours of required pre-professional practice experience in clinical nutrition, community nutrition, management, and research for students who have earned a BS degree in foods, nutrition, or dietetics. The Dietetic Internship Program includes NU 693 and NU 694. Students accepted into an ADA approved Dietetic Internship Program that is approved by the Commission on Dietetic Education (CADE) may apply the internship experience towards the completion of the master's degree. The NU 693 internship will parallel coursework in the UNH MS Human Nutrition program.

**NU 694 Human Nutrition Internship II**
Prerequisite: Bachelor of Science degree in food, nutrition, or dietetics. Permission from the instructor. The Dietetic Internship program provides between 600 and 1700 hours of required pre-professional practice experience in clinical nutrition, community nutrition, management, and research for students who have earned a BS degree in foods, nutrition, or dietetics. The Dietetic Internship Program includes NU 693 and NU 694. Students accepted into an ADA approved Dietetic Internship Program that is approved by the Commission on Dietetic Education (CADE) may apply the internship experience towards the completion of the master's degree. The NU 694 internship will parallel coursework in the UNH MS Human Nutrition program.

**NU 695 Independent Study**
Prerequisite: 15 graduate hours or permission of program director. A planned program of individual study under the supervision of a member of the faculty.

## Psychology

**P 605 Survey of Community Psychology**
An examination of historical roots and current concepts. A social-problems approach to psychological dysfunction. Changing professional roles. Community organization and human service delivery; strategies of intervention and community change.

**P 607 Special Problems in Community Psychology**
Theory and practice of community psychology with selected problems, populations, and settings. Emphasis on community psychology service issues and problems in the Connecticut area.

**P 608 Psychometrics and Statistics**
Prerequisite: intermediate undergraduate course in statistics. Comprehensive introduction to fundamental conceptual and technical aspects of measurement and psychological description of individuals. In-depth treatment of statistical issues such as advanced correlation and regression techniques using SPSSx statistical software to enhance understanding of key concepts. Emphasis on application of measurement and statistics to psychological assessment in field settings.

**P 609 Research Methods**
Prerequisite: P 608. Introduction to analytic concepts pertinent to sampling techniques, research design, variable control, and criterion definition. Basic problems of measurement, research paradigms, sources of error in research interpretation, problems of variable identification and control, and consideration of the logic of inference.

**P 610 Program Evaluation**
Prerequisite: P 609. A systematic study of the processes involved in planning, implementing, and evaluating organizational programs. Focus on action research strategies which integrate the entire process from planning to evaluation of the program.

**Practicum Seminars and Fieldwork (P 611 - P 616):**
An apprenticeship or on-the-job role in an ongoing program or center. Emphasis on developing conceptualizations and insights as a result of involvement in the apprenticeship. Placement at a field site for 8 to 10 hours per week. Weekly class meetings serve two purposes: to present specific theoretical material and research findings appropriate to each seminar and to allow students to discuss their field training experiences. A comprehensive project report is

required in which each student will analyze and integrate fieldwork experience with relevant research and coursework.

### P 611 Individual Intervention Seminar

An examination of strategies for providing direct helping services to individuals in the context of formal and informal networks of social and community support. Includes the nature of the dyadic relationship, development of therapeutic and case management skills, professional ethics, and supervision. Applications to a wide range of problems, populations, and settings.

### P 612 Consultation Seminar

An examination of the consultation process. Includes the role of the consultant, stages of consultation, the development of consulting skills, and political/ethical issues. Different approaches to consultation practice are analyzed, along with their associated interventions.

### P 613 Systems Intervention Seminar

An examination of the dynamics of planned, system-level change in the field of human services. The distinctive characteristics of human service organizations are analyzed; and an overall intervention model is developed, applied, and discussed. Of special interest to those with responsibilities in program planning and implementation.

### P 614 Individual Intervention Fieldwork

Prerequisite: Permission of instructor is required. Supervised field training in the provision of direct services to individual clients. Supervision is provided jointly by the field setting and the psychology department. Students must be available at least one day per week.

### P 615 Consultation Fieldwork

Prerequisite: Permission of instructor is required. Supervised field training in the development of consultation skills. Supervision is provided jointly by the field setting and the psychology department. Students must be available at least one day per week.

### P 616 Systems Intervention Fieldwork

Prerequisite: Permission of instructor is required. Supervised field training in program planning and development. Supervision is provided jointly by the field setting and the psychology department. Students must be available at least one day per week.

### P 619 Organizational Behavior

Analysis of various theories of business and managerial behavior emphasizing the business organization and its internal processes. Psychological factors in business and industry, including motivation, incentives, and conflict. A study of research findings relevant to an understanding and prediction of human behavior in organizations.

### P 620 Industrial Psychology

Prerequisite: P 608 or QA 604 or permission of instructor. Psychological theories and research applied to typical human resource functions in organizations. Topics include selection and placement, job analysis and competency modeling, training and development, performance appraisal, compensation, and human resource planning.

### P 621 Behavior Modification I: Principles, Theories, and Applications

Theory and research in behavior modification. Aversive learning, desensitization, operant conditioning. Applications in clinical and nonclinical settings.

### P 623 Psychology of the Small Group

Analyses of the behavior and interaction of people in mutual gratification groups, committees, work groups, and clubs.

### P 624 Experiential Self-Analytic Group

This experiential group develops understanding of group and interpersonal dynamics through analysis of ongoing interaction and improves participants' interpersonal abilities relevant to organizational consulting and diagnosis.

### P 625 Life Span Developmental Psychology

In-depth explotation of normal and abnormal development through the life cycle. Emphasis on childhood, adolescence, adulthood, and later years. Developmental impact of family, neighborhood, schooling, work, culture. Issues of class, ethnicity, gender, age, etc. Applications of theory and research to community treatment and prevention.

### P 626 Worker Well-Being

This course provides an overview of the frameworks, theories, critical issues, and practices associated with the psychological well-being of people in the workplace. The study of worker well-being, a sub-area of occupational health psychology, includes topics such as work-life integration, alternative employment schedules and employment relationships, antecedents, moderators and consequences of work stress, and organizational interventions to facilitate the health and well-being of workers in organizations.

### P 628 The Interview

The interview as a tool for information gathering, diagnoses, mutual decision making, and behavior change. Use of role playing provides the student with insights into nuances of interpersonal

relationships. Applications to selection, counseling, and other situations.

**P 629 Introduction to Psychotherapy and Counseling**
Theory, research, and practice of psychotherapy and counseling. Examination of the assumptions, roles, and processes of the therapeutic relationship.

**P 632 Group Treatment and Family Therapy**
Introduction to group and family approaches to psychotherapy. Factors important to the successful therapeutic group are discussed.

**P 634 Personality Assessment**
A critical survey of the theories and issues of personality assessment. Includes intelligence, achievement, and ability assessment. Personality tests and ethical questions associated with psychological testing. Laboratory fee required.

**P 635 Psychological Tests and Measurements in Industry**
Prerequisite: P 608 or permission of instructor. Theories, assumptions, and constraints underlying construction and application of psychological tests and measures in industry. Emphasis on selection, validation, and interpretation of appropriate standardized tests and surveys for specific applications in organizations, such as employment testing and employee attitude assessment.

**P 636 Abnormal Psychology**
Etiological factors in psychopathology dynamics and classification of neuroses, psychophysiologic conditions, psychoses, personality disorders, organic illness, retardation, and childhood diseases.

**P 638 Psychology of Communication and Opinion Change**
Characteristics of the source, the situation, and the content of messages, along with other variables influencing attitudinal modification. Cognitive factors and social settings in attitude change.

**P 640 Industrial Motivation and Morale**
Prerequisite: P 619. The meaning of work, theories of motivation, values and expectations, performance and reinforcement, job satisfaction and motivation, pay as an incentive, interventions to increase work motivation.

**P 641 Personnel Development and Training**
Identification of skills and developmental needs, from both organizational and individual perspectives. Techniques for assessment and development of skills, especially at the managerial level. Training approaches. Evaluation of training efforts.

**P 642 Organizational Change and Development**
Prerequisite: P 619 or MG 637. The nature of organizational development, intervention by third-party consultation, change in organizational structure and role relationships, evaluation of change efforts, participation, conformity, and deviation.

**P 643 The Psychology of Conflict Management I**
The constructive management of conflict at the individual, corporate, and multicultural levels. Theories on the etiology of conflict as well as various conflict resolution models. The role of communication and perspective-taking in the constructive resolution of conflict. Students will learn how to manage more constructively their own personal conflicts as well as conflicts occurring at the corporate and multicultural levels.

**P 644 Performance Appraisal Systems**
Theory and applications associated with performance appraisal systems in organizations. Topics include setting relevant performance goals, the performance review session, coaching and counseling, multisource feedback, and rewards and recognition. Emphasis is on the development and implementation of valid and effective appraisal systems.

**P 645 Seminar in Industrial/Organizational Psychology**
Prerequisites: P 609 and P 619. An examination of the professional psychologist at work in organizations. Regular subjects include measurement methods, prediction, validation, selection, training and employee assistance programs, group dynamics, organizational change, stress, performance appraisal. Practitioners in business, industry, research organizations and government will provide insights into the application of psychological principles and methods.

**P 646 The Psychology of Negotiation and Mediation**
Students will be trained in basic negotiation and mediation skills with supervised practice of these skills. Skill development will enable students to resolve conflicts more effectively as well as help build the tools necessary for those interested in becoming mediators or organizational consultants specializing in conflict management.

**P 647 Industrial and Organizational Psychology in Global Settings**
Prerequisites: P 619, P 620, or permission of instructor. Surveys the science and practice of international industrial and organizational psychology. Introduces current perspectives and applications on topics including

multinational work teams, selection and training of expatriates, leadership behavior, performance improvement and rewards across cultures, and individual cross-cultural similarities and differences. Focuses on comparisons with corresponding U.S. systems.

**P 656 Abnormal Psychology in Forensic Populations**
Prerequisites: undergraduate or graduate course in Abnormal Psychology, CJ 601, and CJ 605. This is an advanced course in mental disorders associated with prisons and other forensic practice. Emphasis is on disorders involving violent and predatory behavior including personality disorders, psychoses, pedophilia and other sexual paraphilias. Special emphasis on psychopathy, psychopathology, criminal behavior and Hans Toch's work on psychopathology created in prison settings. Well-known forensic cases will be examined. This course is a prerequisite for all other courses in the Forensic Psychology sequence. (See also CJ 646.)

**P 657 Forensic Assessment and Outcome Evaluation**
Prerequisites: CJ 601, CJ 605, and CJ 646. This course will review the spectrum of assessment instruments used in evaluation and treatment in inmate and patient settings. Pros and cons of forensic interviewing will be examined. Emphasis on ability to assess violence and risk will be included. Students will come to understand the strengths and limitations of a wide variety of clinical assessment tools. Special concentration on techniques to assess malingering. (See also CJ 647.)

**P 658 Forensic Treatment Models**
Prerequisites: CJ 601, CJ 605, CJ 646, and CJ 647. This course will examine various mental health treatment modalities, with particular emphasis on treatment for patients/inmates in the forensic system. Psychopharmacology, group therapy, cognitive techniques, community-based management, faith-based approaches, and social skills training will be covered. Treatment of insanity acquittees, incompetent-to-stand trial patients, inmates, juvenile offenders, psychopaths, and sex offenders will be examined. Management of high-risk forensic populations will be covered. Particular emphasis will be placed on current research findings regarding the effectiveness of these approaches with forensic populations. (See also CJ 648.)

**P 660 Contemporary Issues in Industrial/Organizational Psychology**
Prerequisite: 12 hours in psychology or consent of the instructor. In-depth investigation of topical areas of concern in industrial/organizational psychology. Topics may include, but are not limited to, the impact of EEOC regulations on selection and promotion; assessment centers; the role of the consultant in organizations; flex-time, day care, and other strategies to accommodate family needs of employees; stress in work settings; women in management. Content will be stated at the time the course is scheduled. Students may petition for a particular topic they feel would fit their academic goals. May be taken twice.

**P 670 Selected Topics**
A study of selected issues of particular interest to students and instructor. May be taken more than once.

**P 678 Practicum I**
For students already employed full-time. A job-related research project is carried out under faculty supervision.

**P 679 Practicum II**
A continuation of Practicum I.

**P 693 Organizational Internship I**
For students without experience at the managerial or supervisory level. Under faculty supervision, the student engages in field experience in an industrial setting and produces a comprehensive project report analyzing the internship experience.

**P 694 Organizational Internship II**
A continuation of Organizational Internship I.

**P 695 Individual Intensive Study I**
Prerequisites: completion of required courses or 24 graduate hours and written approval of department chair. Provides the graduate student with the opportunity to delve more deeply into a particular area of study under faculty supervision.

**P 696 Individual Intensive Study II**
A continuation of Individual Intensive Study I.

**P 698 Thesis I**
Prerequisites: completion of all required courses or 24 graduate hours and written approval of department chair. Periodic meetings and discussion of the individual student's progress in the preparation of a thesis.

**P 699 Thesis II**
A continuation of Thesis I.

## Public Administration/ Health Care

**PA 601 Principles of Public Administration**
The development, organization, functions, and problems of national, state, and local governmental administration.

### PA 602 Public Policy Formulation and Implementation

The relationship between public administration and the formulation of public policy is studied. The implementation of public policy by administrators based on the politics of the administrator is examined in terms of interaction between various group representatives such as legislators, politicians, and pressure-group leaders.

### PA 604 Communities and Social Change

Interactions among the community as a social organization and educational, police, and welfare institutions within it; special attention to conceptual frameworks and current research or action programs that particularly affect minority groups.

### PA 611 Research Methods in Public Administration

Recommended: undergraduate course in quantitative methods or introductory statistics. Designed to familiarize administrators with the tools and potentialities of social research and to assist them in the presentation, interpretation, and application of research data.

### PA 620 Personnel Administration and Collective Bargaining in the Public Sector

Recommended: PA 601. Study of the civil service systems in the United States and the state governments, including a systematic review of the methods of recruitment, promotion, discipline, control, and removal. Explores the effects on work relationships of collective bargaining statutes which have been adopted by legislatures. Emphasis is placed on collective bargaining case studies from state and local governments and hospitals.

### PA 625 Administrative Behavior

Recommended: PA 601. The problems faced by an administrator in dealing with interpersonal relationships and human processes. Analysis of individual and group behavior in various governmental and business settings to determine the administrative action for the promotion of desired work performance. Emphasis given to the public sector. Participation in actual problem situation discussions and case studies.

### PA 630 Fiscal Management for Local Government

Recommended: PA 601. The problems faced by a survey of the essential principles of governmental accounting, budgeting, cost accounting, and financial reporting. The various operating funds, bonded debt, fixed assets, investments, classification of revenue and expenditures, general property taxes, and interfund relationships.

### PA 632 Public Finance and Budgeting

Recommended: PA 601. State and local expenditure patterns and revenue sources, income taxation at the state and local levels, excise taxation, sales taxation, taxation of capital, and the property tax. Emphasis on fiscal and economic aspects of federalism and federal/state fiscal coordination. The role of the budget in the determination of policy, in administrative integration, and in control of government operations.

### PA 641 Financial Management of Health Care Organizations

Recommended: MG 640. Theory and application of financial planning and management techniques in health care organizations. Emphasis on financial decision-making and on preparation of short- and long-term cash, capital, revenue and expense budgets and financial plans to meet the requirements of HCFA and other third parties.

### PA 642 Health Care Delivery Systems

An analysis of contemporary health care delivery systems in the U.S. Financial, cost, economic, political, and organizational issues will be discussed.

### PA 643 Health and Institutional Planning

Designed to develop skills in and understanding of the dynamics of health and social planning processes with respect to consumer demand, national and local health goals, and the optimal location of facilities, services, and manpower.

### PA 644 Administration of Programs and Services for the Aged

The structure, function, and properties of publicly and privately funded programs and service organizations providing health services to the aged. The economic, political, legal, and social issues which affect the administration of human service organizations will be studied, with emphasis on administration of health care services.

### PA 645 Health Care Economics and Finance

Recommended: PA 641. Integration of accounting, economics, finance, budgeting, and health insurance principles, concepts, and analytic tools essential to the decision-making processes of health care organizations.

### PA 646 Organization and Management of Long-Term Care Facilities

Examines the variety of systems providing long-term care services for the aged. Special concentration on the ways various facilities are managed and on the impact of state bylaws. Case studies illustrate decision making and problem solving within health institutions.

**PA 647 Alternative Health Care Delivery Systems**
A survey of nontraditional approaches to health care. Includes cost shifting, cost sharing, the development of outpatient facilities, and the impact of cost containment regulation in a systems-oriented framework.

**PA 648 Contemporary Issues in Health Care**
Gives health care professionals a broad view of current topics in their field. Students will view current videotapes, work on case studies, participate in class exercises, and present several reports. Current articles illustrate the issues under discussion.

**PA 649 History and Development of Health Care Institutions**
Historical development of health care institutions and its effect on their current economic and social status.

**PA 651 Health Care Ethics**
Explores and defines a wide spectrum of critical ethical issues; factors that should be considered in resolving these issues; investigation of ways in which organizations can anticipate and plan for future ethical problems.

**PA 652 Introduction to Managed Care**
Managed care concepts including types, structures, financial incentives, administrative tools, and marketing approaches; relationships between provision of medical care and various types of managed care organizations; emphasis on health maintenance organizations (HMOs) and preferred provider organizations. Management structures, quality assurance, utilization management, financial functions, and health insurance alternatives.

**PA 653 Cost Containment in Health Care**
Overview of methods used to attempt to contain the rise of health care costs; practical approaches to cost containment as well as skills necessary to implement and evaluate cost containment strategies.

**PA 657 Health Care Reimbursements**
Ways reimbursements are regulated and collected; financial implications of third-party reimbursements for all types of health care providers. Focus on history as well as current and future programs related to the most complicated payment methods in any industry.

**PA 659 Human Resource Planning in Health Care**
Exploration of principles and functions of human resource planning in a health care organization. Topics include legal and public policy parameters, demographics and the health care workforce, disparate employee groups and their special concerns, implementation and evaluation of human resource planning in health care settings.

**PA 661 Problems of Metropolitan Areas**
Analysis of the problems of government and administration arising from the population patterns and physical and social structures of contemporary metropolitan communities.

**PA 662 Recruitment and Retention of Health Care Professionals**
The purpose of this course is to provide the health professional with theories and methods to recruit and retain the health care professional in the health care setting. As well as preparing health professionals who actually recruit health care professionals, it will also provide those not in the recruitment role an understanding of various methods and techniques to retain professionals working in their departments.

**PA 664 Survey of Medical Group Management**
Business management in the physician group practice arena. Beginning with the start-up phase, complete coverage of the process. Current as well as future directions in physician group management and ways to enhance its profitability.

**PA 669 Health Care Policy, Planning, and Execution**
Prerequisites: MG 630, MG 640. Overview of methods used in strategic planning. Practical approaches to management techniques, financial planning, cost containment, service delivery, and strategies in strategic management.

**PA 670/671 Selected Topics**
A study of selected issues of particular interest to students and instructor. May be taken more than once.

**PA 680 Seminar in Public Administration**
Exact material to be covered will be announced.

**PA 681 Long-Term Health Care Internship I**
Prerequisites: PA 641, PA 646. First of two internships state-required for eligibility to take the State of Connecticut licensing examination in long-term care administration. Course is composed of a 450-hour nursing home internship.

**PA 682 Long-Term Health Care Internship II**
A continuation of Long-Term Health Care Internship I.

**PA 683 Long-Term Health Care Internship**
Prerequisite or corequisite: PA 646.

Course is composed of 500 hours in a skilled nursing facility. This course is available only to students who will have completed at least 45 hours of an appropriate graduate program. Contact the Director, Health Care Program, for further information.

**PA 690 Research Seminar**
Recommended: PA 611. Requirements include a major independent research study and participation in an integrative seminar on research and its uses in public administration, health care administration, labor relations, and related disciplines.

**PA 693 Public Administration Internship**
Prerequisites: 15 graduate hours and permission of the public administration graduate program coordinator. A supervised work experience in a cooperating public service agency. Students must be available at least one day per week.

**PA 695 Independent Study I**
A planned program of individual study under the supervision of a member of the faculty.

**PA 696 Independent Study II**
A continuation of Independent Study I.

**PA 698 Thesis I**
Prerequisite: 15 graduate hours. Periodic meetings and discussion of the individual student's progress in the preparation of a thesis.

**PA 699 Thesis II**
A continuation of Thesis I.

## Physics

**PH 613 Radioactivity and Radiation in the Environment**
Prerequisites: EN 600 and CH 601, or permission of instructor. Basic principles of nuclear structure and radioactivity; the interaction of radiation with matter and biological effects of radiation; natural and man-made sources of radiation in the environment. The second half of the course will focus on long-term environmental effects of radiation accidents (e.g., Chernobyl) and the problems of nuclear waste disposal, plutonium inventories from nuclear weapons, natural radon in buildings, and similar concerns. (See also EN 613.)

**PH 670 Selected Topics: Physics**
Prerequisite: permission of the instructor. A study of selected topics of particular interest to students and instructor. Course may be taken more than once.

## Philosophy

**PL 601 Business Ethics**
Problems include the nature of the corporation, the values of business activity, corporate social responsibility, the proper relationship between the corporation and government, employee rights, and related matters. Problems are analyzed using the most important current theories of social and economic justice.

**PL 614 Philosophy of Education**
A critical analysis of education in contemporary society as reflected in the thinking of modern and early philosophers. (See also ED 614.)

## Political Science

**PS 601 Constitutional Law**
A study of the judicial process and its relation to the Constitution and the political system in the United States. Examines the role of the Supreme Court in shaping judicial review, federalism, civil rights, and liberties, equal protection and due process.

**PS 602 Civil Liberties and Rights**
An analysis of civil liberties, civil rights, due process, and equal protection of the law. An examination of the role of the public official in the protection, denial, or abridgment of the constitutional and legal rights of individuals.

**PS 603 International Law**
A study of the role of international law in the modern state system with particular reference to individuals; territorial jurisdiction; law of the sea, air, and space; and the development of law through international organizations.

**PS 604 Human Rights and the Law**
An examination of the development of the international and national laws establishing human rights, the laws of war, war/criminality, crimes against humanity, and the application of the universal declaration of human rights, of the Helsinki Accords, and of the concept of the individual as the basis of law.

**PS 605 Criminal Law**
Scope, purpose, definition, and classification of criminal law. Offenses against the person, habitation and occupancy offenses against property, and other offenses. Special defenses. Emphasis on the Connecticut penal code.

**PS 606 Advanced International Relations**
Basic elements of international life relevant to the growth of a stable and peaceful global political-economic system. Includes power, diplomacy, law, trade, aid, monetary affairs, multinational corporations, and differing geographical and cultural characteristics.

**PS 608 The Legislative Process**
An analysis of the legislative process in the American political system.

Stress on legislative politics in state and local government. Includes legislative functions, selection and recruitment of legislative candidates, legislative role orientations, the legislative socialization process, the committee system, the legislators and their constituencies, legislative lobbyists, legislative decision making, legislative-executive relations, and legislative organization and procedures.

### PS 610 Legal Methods I

A study of procedure and process of the law as it applies in the American system and an introduction to legal research and writing.

### PS 612 Contracts, Torts, and the Practice of Law

An introduction to the most important components of private law—contracts, torts, and civil procedure and their application to business, government, and individuals.

### PS 615 Jurisprudence

The general philosophical framework for the law. Includes the background and development of the common law, sources of the law, and the court system. Special problems in Anglo-American jurisprudence are reviewed.

### PS 616 Urban Government

An examination of the urban political system. Stress on the political aspects of urban government structures. Includes formal and informal decision making in urban government, community power structures, types of urban government structures, the politics of intergovernmental relations, and the politics of servicing the urban environment (social services, planning agencies, education, housing, transportation, health, pollution control and ecology, revenue sharing, public safety, neighborhood corporations, etc.).

### PS 617 Law, Science, and Ethics

The intersection of law, science, and ethics in a variety of contexts, including experimentation with human subjects, psychosurgery, genetic engineering, organ transplants, abortion, and the right to die.

### PS 625 Transnational Legal Structures

An introduction to the basic structure of legal systems in other countries, their relationship to Anglo-American law, and their contextual development. Special topics include legal status of foreign and multinational corporations, rights and responsibilities of aliens, protections for investors, expropriation, and procedural due process.

### PS 626 Decision Making in the Political Process

An in-depth study of decision making in the American system with special emphasis on the various types of mechanisms: executive, legislative, judicial, bureaucratic, organizational, and military. The influence of intelligence, economic, and psychological factors and social pressure on decisions and decision makers will be examined.

### PS 628 Change and Government

A study of the major processes of change and their consequences for the functioning of government. Concentrates on changes that may occur through violence, evolution, or technology and that may alter the effective operation of government.

### PS 633 The Political Process and the Aged

A study of the political process as it relates to the aged. Governmental decision making on federal, state, and local levels including legislation and its implications.

### PS 635 Law and Public Health

A course for the civil servant or health professional concerned with the laws relating to the public health at the federal, state, and local level as well as the practical administration of those laws.

### PS 640 Law and Education

An examination of the legal and educational issues arising from factors such as EEO, students' rights, student financing, and the relationships between schools and government.

### PS 641 The Politics of the World Economy

An examination of the global politico-economic system and the challenges facing world diplomacy. Multinational corporations and political structures designed to coordinate global policies for the monetary and trade systems, international organizations and their impact on Third World development, and problems facing industrialized nations.

### PS 645 Government and the Industrial Sector

The various impacts of government regulation on the corporate sector and the major legal and regulatory requirements affecting business and industry.

### PS 655 Conflict Resolution

Essential features and methods available within the legal system to resolve disputes, including the uses of law, equity, administrative agencies, bureaucracies, arbitration, mediation, special commissions, and private self-help. Applicability of these methods to various types of disputes and the choice of law in instances when no single rule may govern in a federal system.

### PS 670 Selected Topics

A study of items of special interest, may include First Amendment problems, energy and the law, law and the environment, labor legislation and

the law, law and commercial paper and stock issues. May be taken more than once.

**PS 695 Independent Study I**
A planned program of individual study under the supervision of a member of the faculty.

**PS 696 Independent Study II**
A continuation of Independent Study I.

## Quantitative Analysis

**QA 604 Probability and Statistics**
Statistical methods and theories used in solving business problems. Topics include data analysis, discrete and continuous probability distributions, statistical inference and estimation, regression and correlation analysis, the analysis of variance, decision theory, and nonparametric tests including chi-square. Students will use computers to conduct statistical tests using the information presented.

**QA 605 Applied Statistics**
A continuation of QA 604. Includes regression and correlation, multiple regression, analysis of variance, the general linear model, and an introduction to time series analysis and forecasting techniques.

**QA 607 Forecasting**
Prerequisite: QA 605. A wide range of forecasting methods useful to students and practitioners of management, economics, and other disciplines requiring forecasting. Focus on quantitative techniques of forecasting; will include smoothing and decomposition approaches, multiple regression and econometric models, and autoregressive/moving average methods including generalized adaptive filtering and Box-Jenkins methodology.

**QA 614 Decisions in Operations Management**
Prerequisites: MG 637 and QA 604, or equivalents. Study of organizations as systems producing goods and services. Review of concepts, functions, and basic techniques as applied to operations management. Examination of new trends and developments such as just-in-time, synchronous manufacturing, quality management, cycle-time reduction, and concurrent engineering. Emphasis on interrelations of different operational decisions on the final product and competitive position of the organization.

**QA 638 Cost Benefit Management**
Prerequisites: EC 601, FI 601, and QA 604. An introduction to and overview of the field of cost benefit management. Fundamental theoretical evaluation of cost/benefit of a project. Includes the selection of the best investment criteria, the external environment spillover effects, and the application of cost/benefit management decision making under uncertainty.

**QA 670 Selected Topics**
A study of selected issues of particular interest to students and instructor. Course may cover decision science methods such as experimental design, nonparametrics, data analysis with SPSS, Bayesian decision theory, and simulation. May be taken more than once.

**QA 675 Computer-Aided Multivariate Analysis**
Prerequisite: QA 604 or equivalent. Summary, for students and researchers, of several widely used multivariate statistical analysis techniques and computer packages. Topics include the nature and concept of scientific problem solving, applied regression analysis and its limitations, multiple frequency analysis, profile analysis of repeated measures, canonical correlation analysis, discriminant analysis, cluster analysis, principal components analysis, and factor analysis.

**QA 690 Research Project**
Prerequisite: 15 graduate hours or permission of the instructor. Independent study under the supervision of an advisor.

**QA 695 Independent Study I**
A planned program of individual study under the supervision of a member of the faculty.

**QA 696 Independent Study II**
A continuation of Independent Study I.

**QA 698 Thesis I**
Prerequisite: 15 graduate hours. Periodic meetings and discussion of the individual student's progress in the preparation of a thesis.

**QA 699 Thesis II**
A continuation of Thesis I.

## Occupational Safety and Health

**SH 602 Safety Organization and Administration**
Intensive study of the occupational safety and health field as it currently exists. History and growth of industrial safety. Motivational and psychological aspects of accident prevention. Legal aspects of safety, including worker compensation and state and federal regulations. Engineering needs. Development of voluntary standard systems. Fire prevention, industrial hygiene, and future directions.

**SH 608 Industrial Hygiene Practices**
Prerequisite: introductory chemistry. Recognition of the magnitude and extent of the health hazards characteristic of industrial work. An evaluation of the danger, the control of hazards, and the protection of the worker.

**SH 615 Toxicology**
Prerequisite: introductory chemistry. Introduction to environmental and industrial toxicology; toxicologic evaluation; the modes of entry, absorption, and distribution of toxicants; the metabolism and excretion of toxic substances; interactions between substances in toxicology; toxicologic data extrapolation; particulates; solvents, and metals; agricultural chemicals—insecticides and pesticides; toxicology of plastics; gases; food additives; plant and animal toxins; carcinogens, mutagens, and teratogens. (See also EN 615.)

**SH 620 Occupational Safety and Health Law**
A survey of the major federal occupational safety and health laws with an emphasis on the Occupational Safety and Health Act of 1970 as well as state worker's compensation laws. Focus on the administration of the laws, their major provisions, and the enforcement process as well as the federal/state interrelationships in this milieu.

**SH 630 Product Safety and Liability**
An investigation into the legal pitfalls and the human concerns inherent in the marketing and consumption of goods: seller's responsibility, product liability, insurance, labeling requirements. The Consumer Product Safety Act and related acts, the procedures for minimizing legal risk and maximizing human safety and health.

## Sociology

**SO 601 Minority Group Relations**
An interdisciplinary survey of minority groups in the United States with special reference to ethnic, religious, and racial factors that influence interaction.

**SO 610 Urban Sociology**
Prerequisite: PA 604. The problems of urban growth and development. Residential patterns together with the physical development of cities and their redevelopment. An examination of the people and their relationships to the environment.

**SO 620 Sociology of Bureaucracy**
A study of some of the classic conceptualizations of bureaucracy and their relevance to the structure and functioning of American economic and governmental institutions. Gives students informational and experiential resources with which they, as planners and managers, can improve their ability to make effective policy decisions.

**SO 641 Death and Suicide**
In-depth analysis of suicide. Traditional theories of suicide are analyzed regarding the psychological approach as well as the demographic and group analysis of sociology. The goal of the course is both academic and practical, stressing community application.

**SO 649 Seminar in Health and Social Policy**
Analysis of the legal, political, social, economic, and organizational factors in planning and providing health care services, with emphasis on policy formulation and implementation. Current health policy issues.

**SO 651 Social Gerontology**
Basic introduction to the field of gerontology. Discusses the history and definition of the field, the contributions of academic disciplines to the field, various perceptions of aging; explores the basic theories, problems, and prospects of gerontology.

**SO 670 Selected Topics**
A study of selected issues of particular interest to students and instructor. May be taken more than once.

**SO 695 Independent Study I**
A planned program of individual study under the supervision of a member of the faculty.

**SO 696 Independent Study II**
A continuation of Independent Study I.

**SO 698 Thesis I**
Prerequisite: 15 graduate hours. Periodic meetings and discussion of the individual student's progress in the preparation of a thesis.

**SO 699 Thesis II**
A continuation of Thesis I.

## Tourism and Hospitality Management

**THM 920 Strategies for Event Planning**
Prerequisite: Consent of instructor. Strategies necessary for event planning involve management, planning, budgeting, costing, marketing, escorting, and evaluation of group tour principles. Principles involve goals and objectives, economic impact, monitoring, and control to assure proper plan implementation. Additional related issues will be addressed.

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**UNH Website**
**Mathew Hochberg,** BS, Webmaster

**Veterans' Affairs Officer**
**Virginia D. Klump,** Graduate Registrar

**WNHU Radio Station**
**Henry K. Yaggi, III,** BA, General Manager

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# University *of* New Haven – Building Numbers, Names, and Departments

1 **Maxcy Hall** - President's Office, Administrative Offices, Bursar's Office, College of Arts and Sciences, College of Business, Career Services, Financial Aid
2 **Bayer Hall** - Undergraduate Admissions
3 **Gate House** - Graduate Admissions
4 **South Campus Hall** - Graduate & Undergraduate Registrar's Offices, Henry C. Lee College of Criminal Justice and Forensic Sciences
5 **Harugari Hall** - Classrooms -South Campus
6 **M.K. Peterson Library**
7 **Campus Bookstore**, Campus Police
8 **Bartels Hall** - Student Center, Dining Hall
9 **Buckman Hall** - Tagliatela College of Engineering
10 **Dodds Hall** - Dodds Theater, Classrooms, Henry C. Lee Institute of Forensic Science
11 **Kaplan Hall** - Evening Studies, Classrooms
12 **Echlin Hall** - Information Services, ID Card Office, University College, Executive MBA, Fire Science, Computer Labs
13 **New Hall** - Purchasing, Business Office, Alumni Relations and University Advancement, Residence Hall, Dining Hall
14 **Subway Bldg** - University Marketing and Publications, Public Affairs
15 **Dental Hygiene**
16 **Human Resources**
17 **Athletics Offices** - North Campus
18 **Charger Gymnasium** North Campus
19 **Psychology Bldg**
20 **Sheffield Hall** - Health Services, Disability Services & Resources, Counseling Center, Residence Hall
21 **Bixler Hall** - Office of Residental Life, Residence Hall
22 **Bethel Hall** Freshman Residence Hall
23 **Botwinik Hall** - Residence Hall
24 **Dunham Hall** - Residence Hall
25 **Winchester Hall** - Residence Hall
26 **Ruden Street Apt.** - 1, 2, 3, Residence Apartments
27 **Forest Hills Apts.** - 1, 2, 3, & 4, Residence Apartments
28 **15 Ruden Place** - Residence Apartments
29 **David A. Beckerman Recreation Center** - Opening November 2007
30 **Arbeiter Maenner Chor** - German Club
31 **Facilities**

# Notes

# Notes

# Notes

# Notes

# Graduate Application for Admission

## INSTRUCTIONS FOR APPLICANTS

This application must be filled out and returned to the Graduate Admissions Office, University of New Haven, 300 Boston Post Road, West Haven, CT 06516, along with:

[1] A $50 nonrefundable application fee. Your application will not be processed unless accompanied by the fee.

❑ Check enclosed ❑ MasterCard

❑ Visa ❑ American Express

# _____

Expiration _____

[2] Official transcripts forwarded by all colleges previously attended.

[3] Two letters of recommendation. Please make sure the addresses and phone numbers of recommenders are included on all letters of recommendation for acknowledgement purposes.

[4] Standardized test scores (GMAT, GRE, PRAXIS) when required by a specific program.

[5] A resume is strongly recommended for all applicants to the Graduate School.

## APPLICANT'S INFORMATION

Legal name _____
*last name (surname)* *first name* *middle initial*

Names different from above that may appear on academic records _____

Date of birth _____ Social Security number _____
*month/day/year*

Current mailing address _____
*street or P.O. Box/apt. number*

_____
*city* *state* *zip code*

Telephone ( ) _____ Email address _____

Permanent address *(if different from above)* _____
*street or P.O. Box/apt. number*

_____
*city* *state* *zip code*

Telephone ( ) _____ Email address _____

Program for which you are applying _____

Concentration choice within program, if any _____

I plan to study ❑ Part-time ❑ Full-time

Intended entry term ❑ September *(year: )* ❑ January *(year: )* ❑ April *(year: )* ❑ Summer *(year: )*

Location ❑ Main Campus (West Haven) ❑ Other *(specify)* _____

FOR U.S. CITIZENS ONLY: To meet federal and state reporting requirements, please check below. This information is not used to determine eligibility for admission. Please note that this section is OPTIONAL.

❑ American Indian ❑ Black *(non-Hispanic)* ❑ Hispanic ❑ Caucasian ❑ Asian or Pacific Islander ❑ Other

❑ Male ❑ Female

## ACADEMIC RECORD

List in reverse chronological order all colleges and universities attended, including UNH.

| Name of school | Location *(city/state)* | Attendance *(from/to)* | Major | Degree Received | Graduation Date |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

## EMPLOYMENT RECORD

List all jobs you have held within the past five years, starting with your present position.

| Position/title | Employer | Location *(city/state)* | Dates *(from/to)* | Telephone # |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |

Does your employer have a tuition assistance plan? ❑ Yes ❑ No

How did you learn about UNH?

Have you ever been convicted of any violation of state or federal law other than a minor traffic violation? ❑ Yes ❑ No

If yes, please explain in full on an attached sheet of paper

Are you a citizen of the U.S.? ❑ Yes ❑ No If no, indicate status

If you are a permanent resident, please provide alien registration number *(provide copy)*

## INTERNATIONAL STUDENTS

If you are an international student, please answer the following questions.

City and country of birth Country of citizenship

Present visa status Intended visa status

❑ Male ❑ Female Native language How many years have you studied English?

TOEFL score Date taken Date to be taken

The information supplied on this application is complete and true to the best of my knowledge. No materials and supporting records submitted by me or on my behalf in connection with this application or my attendance will be released to anyone other than authorized university personnel without my consent. It is understood that incorrect or falsified information will be grounds for disapproval of this application or dismissal from the university. The undersigned agrees to pay all financial obligations if admitted to and attending the university, including assessed collection costs and any obligations incurred if financial aid is terminated, reduced, or postponed for any reason. I agree to be governed by the academic standards, policies, rules, and regulations of the University of New Haven and to meet all financial obligations incurred by my attendance at UNH. The undersigned also authorizes the Department of University Marketing & Publications to publish the applicant's picture, address, major, honors, sports, or other activities for public relations purposes should the applicant decide to attend the university in any capacity. This publicity authorization may be rescinded by notifying the Department of University Marketing & Publications in writing within 30 calendar days of admission to the university. Information related to campus crime statistics and security measures is available upon request.

Applicant's signature Date

*The University of New Haven is committed to equal access to educational and employment opportunities for all applicants regardless of race, creed, color, religion, gender, national or ethnic origin, age, sexual orientation, or disability, in compliance with federal and state statutes. In order to receive accommodations for a disability, students must initiate a request for services by calling the Director of Disability Accommodation Services at 203-932-7331.*

UNIVERSITY OF
NEW HAVEN

300 Boston Post Road
West Haven, CT 06516

Call Toll Free
1.800.DIAL.UNH (342.5864)

Admissions Office
Graduate 203.932.7440

Internet
www.newhaven.edu